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* Owing to an error in pagination this and subsequent pages are numbered 100 too high.

BULLETIN OF MISCELLANEOUS INFORMATION No. 1 1939 ROYAL BOTANIC GARDENS, KEW

I—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA : XXXVIII.*

PLANTAE HINTONIANAE : IX†.—A. A. BULLOCK.

The following new binomials have been found to be necessary while working out Mr. Hinton's recent Mexican collections of *Mimosaceae*. The maintenance of the numerous genera segregated from *Acacia* and *Mimosa* by Britton and Rose (N. Amer. Fl. **23**, parts 2 and 3 : 1928) would, in the writer's opinion, serve no useful purpose. They correspond at most to sections or groups of lower rank as recognized by other authors. For reasons given below only a few transferences have been made, all in connexion with Mr. Hinton's collections.

Many of the new species of *Mimosaceae* described by Britton and Rose are unrepresented by authenticated specimens at Kew, and no opinion can be expressed as to their taxonomic value. The keys are extremely difficult and the descriptions very inadequate, and it seems probable that these authors did not take into account the possibility of the existence of habitat and other intraspecific variations, with the result that their species may be too narrowly circumscribed. Until an opportunity arises of examining type-material, transference in such cases is clearly undesirable.

Acacia delicata (Britt. et Rose) Bullock, comb. nov.—*Acaciella delicata* Britt. et Rose in N. Amer. Fl. **23**, 100 (1928).

Tecpan, District of Galeana, State of Guerrero, 20 m., by the trail, Nov. 1937 (fl., young fr.), *Hinton* 10896, "flowers white."

This specimen appears to be conspecific with the Kew specimen of *Palmer* 298 (1894-5) the type collection of the species, although the stipe of the very young fruit indicates that it will, when mature, be somewhat longer.

Acacia igualensis (Britt. et Rose) Bullock, comb. nov.—*Acaciella igualensis* Britt. et Rose in N. Amer. Fl. **23**, 102 (1928).

District of Temascaltepec, State of Mexico : Volcán, 1450 m., Nov. 1932 (fl.), *Hinton* 2500, "a shrub 3 m. high"; *ibid.*, Aug. 1935 (fl.) *Hinton* 8136; Tejupilco, 1400 m., Dec. 1933 (fr.), *Hinton* 5412, "a shrub 2 m. high."

The above specimens appear, from the description, to belong to this species.

* Continued from K.B. 1938, 384.

† Continued from K.B. 1938, 294.

Acacia Langlassei (Britt. et Rose) Bullock, comb. nov.—*Senegalia Langlassei* Britt. et Rose in N. Amer. Fl. **23**, 116 (1928).

Pasion, District of Montes de Oca, State of Guerrero, 400 m., Oct. 1937 (fl.), *Hinton* 10785, "flowers white."

The type-locality "La Botella" is in Michoacan or Guerrero, according to Langlassé's label, and to Britton and Rose. The present specimen matches the type collection perfectly. Langlassé's notes, not recorded by Britton and Rose, may be of interest: "Arbre de 12 à 15 m. Branches épineuses. Fleurs blanc jaunâtre." Langlassé also gives the vernacular name "Rabo de Iguanà" and states that the tree occurs in alluvial soil. Mr. Hinton notes that it occurs "I[n] R[ipa] F[luminis]".

Acacia procumbens Bullock, nom. nov.—*Acaciella prostrata* Britt. et Rose in N. Amer. Fl. **23**, 102 (1928), non *Acacia prostrata* Lodd. Bot. Cab. t. 63 (1822).

District of Temascaltepec, State of Mexico: Temascaltepec, 1750 m., Aug. 1932 (fl.), *Hinton* 1423, "recumbent on ground"; Chorrera, 1230 m., on a dry hill, Aug. 1932 (fl.), *Hinton* 1291. Manchon-Palmita, District of Mina, State of Guerrero, on the llano, Sept. 1936 (fl.), *Hinton* 9418, "procumbent, flowers white."

These specimens match the Kew specimen of *Pringle* 4478, the type-collection, except that they have somewhat larger leaflets, and are clearly taken from more luxuriant plants.

Mimosa moreliensis (Britt. ex Britt. et Rose) Bullock, comb. nov.—*Mimosopsis moreliensis* Britt. ex Britt. et Rose in N. Amer. Fl. **23**, 178 (1928).

Tequesquipan, District of Temascaltepec, State of Mexico, March 1935 (fr.), *Hinton* 7446.

This specimen is a fair match of an unnumbered specimen in the Kew Herbarium collected by Arsène at the type-locality. The pinnae and leaflets are, however, distinctly larger.

Desmanthus interior (Britt. et Rose) Bullock, comb. nov.—*Acuan interior* Britt. et Rose in N. Amer. Fl. **23**, 134 (1928).

Acatitlán, District of Temascaltepec, State of Mexico, on the llano, Sept. 1933 (fl.), *Hinton* 4795; *ibid.*, Aug. 1935 (fl., fr.), *Hinton* 8218, "a shrub 1.5-3 m. high." Pungarabato, District of Coyuca, State of Guerrero, on the llano, Oct. 1934 (fr.), *Hinton* 6885, "a shrub 2 m. high."

These specimens provide a fair match of the Kew specimen of *Arsène* 2521, the type number, but the legumes on Mr. Hinton's fruiting specimens are longer, with a longer beak; the leaves also are larger, with more numerous leaflets.

The generic name *Desmanthus* Willd. (1806) is antedated by *Acuan* Medic. (1786), but is conserved under the International Rules.

II—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA : XXXIX.

RESULTS OF A RECENT COLLECTING EXPEDITION TO BRITISH GUIANA.—N. Y. SANDWITH.

The following notes and descriptions are based mainly on the collections made in British Guiana by the writer in August and September, 1937. He was the botanical member of a party of entomologists led by Dr. O. W. Richards which stayed for some weeks at Colony House, Mazaruni Station, and worked the neighbouring secondary growth and virgin forest. He was also privileged to accompany Mr. T. A. W. Davis, Assistant Conservator of Forests, on two short camping expeditions, the first to the wallaba forests near the 14th milepost along the Bartica-Potaro road, the second to forests by the Labbakabra Creek at a distance of some six miles to the north of Mazaruni Station. The large trees were not flowering well so near the end of the long rainy season, but the saprophytes were appearing in great profusion, and many interesting species were collected.

With the kind help of the Forest Department a trip to the Kaieteur Falls, lasting over a fortnight, was arranged and successfully carried out, and the party had the great good fortune to spend eleven days collecting in this wonderful district. During that time the writer was able to make about 280 gatherings, two of his objects being to prepare several duplicate sets of many of the extraordinary endemics which abound on the Kaieteur Savannah, and to re-collect new species (especially *Utriculariae*) detected on the recent Cambridge University Expedition. Although both the season and duration of the visit more or less coincided with those of Jenman and Tutin, some additional discoveries have naturally been made. Two days were also spent in struggling through the fearful chaos of rocks underlying the gloomy forests of the gorge ; but the actual foot of the Falls was not reached.

Specimens of several families have been sent to specialists, and it is hoped that further botanical results of the expedition will be published in later papers. A few records made on recent trips of the Forest Department to the Demerara and Berbice Rivers are included.

THEACEAE.

Ternstroemia verticillata Klotzsch ex Wawra.

Kaieteur Savannah, Sept. 2nd, 1937, *Sandwith* 1295. A small tree in thickets on rocky ground. Flowers sweet-scented. Sepals white with deep red centre within. Petals yellow.

The sepals are less acute, being sometimes actually rounded, and the leaves are not regularly and copiously gland-dotted beneath ; otherwise the material agrees well with the type in the Berlin Herbarium.

BOMBACACEAE.

Catostemma Altsoni *Sandwith* in Kew Bull. 1928, p. 366 ; 1931, p. 54.

This species was described from a single collection made on the Kurupung River in 1925, the material being distinguishable from both *C. commune* Sandwith and *C. fragrans* Benth. by the much larger flowers on long pedicels, the calyx splitting into 3 instead of 2 lobes. The glabrous leaves resembled those of *C. commune* rather than those of *C. fragrans*, but the distribution of the small bracteoles favoured the latter species. The style was incorrectly described as glabrous, further examination having shown that it is stellate-pubescent in the lower third. The style-branches were much longer than those of either ally. Seedling leaves and fruits were not represented.

During the last few years no less than three collections of a very distinct *Catostemma* have been made in the sandy wallaba (*Eperua*) forests of the Essequibo-Mazaruni Divide, near the Bartica-Potaro road to the south of Bartica. This tree grows plentifully in association with *C. fragrans*, but is more closely related to *C. commune*, which it resembles in the compound leaves of the seedlings, the irregular venation of the glabrous leaves, the stellate-pubescent lower third of the style, and the short style-branches. It is immediately distinguished from *C. commune* by the very long and narrow cusps of the seedling leaflets (a character of the simple seedling leaves of *C. fragrans*), by the small bracteoles which are scattered near the middle of the pedicel or even far below it, and the long pedicels. Above all, it differs from both species in the stiffly coriaceous mature leaves, the margins of which are frequently revolute, in the very much larger flowers, with the calyx splitting into 3 instead of 2 lobes, and in the larger, conspicuously acuminate fruit.

Comparison with the material of *C. Altsoni* has convinced the writer that the Bartica-Potaro road tree is to be referred for the present to that species, with which it obviously agrees in many characters of foliage and inflorescence. The type specimens of *C. Altsoni* differ in the more regular and parallel appearance of the secondary nerves of the leaves which are often rounded at the base, in the longer stamens, and especially in the conspicuously longer style-branches. The constancy of these characters should eventually be checked by further collections of *C. Altsoni* in the same region, but it may be noted here that a certain variability has been observed in the length of the style-branches of *C. fragrans*. Meanwhile, a description of the Bartica-Potaro road tree has been drawn up which may provisionally be regarded as a supplementary, or even an emended, description of *C. Altsoni*.

Arbor excelsa, circiter 30 m. alta. *Folia plantarum incipientium* trifoliolata; foliola oblanceolata vel elliptica, apice longe anguste caudato-acuminata, acumine lineari-subulato vulgo 2-3 cm. longo supra medium 1.2-2 mm. lato, terminalia basi cuneata, lateralibus obliqua latere inferiore rotundata, in exemplis visis 10-18.5 cm. longa, 3.5-6.2 cm. lata, glabra, supra nitida, chartacea, costa in terminali centrali, in lateralibus excentrica, utrinque subtiliter

reticulata, nervis primariis utroque costae latere circiter 8-12 plus minusve ut in *C. communi* arcuatis, reticulatione valde irregulari quoqueversus versante ; petiolus glaber, sulcatus, ad 14 cm. longus, apice basique velut petioluli breves incrassatus nigrescens. *Ramuli arboris maturae* glabri, saepius breves foliis apice fasciculatis. *Folia matura* vulgo obovata, rarius obovato-oblonga vel fere elliptica, apice generis typico, basi in petiolum valde attenuato-cuneata, ad 16 cm. longa, ad 8.2 cm. lata, utrinque glabra, nitidula, crasse coriacea marginibus saepius revolutis, costa lata valde conspicua utrinque praesertim subtus prominente, nervis ceteris supra subplanis haud conspicuis subtus prominentibus, reticulatione irregulari ; petiolus 1-4.8 cm. longus. *Flores* in quoque fasciculo complures, saepe ad 10, albi, speciosi, fragrantés ; pedicelli stellato-tomentosi, (3-) 4-7 cm. longi ; bracteolae 3, prope medium vel infra medium pedicellum intervallis irregularibus dispersae, late ovatae, 1-1.75 mm. longae, ad 1.5 mm. latae, extra prope basin fere lanato-tomentosae, superne brunneae glabrescentes. *Alabastra* matura stellato-tomentosa, ad 1.4 cm. longa. *Calyx* tubo campanulato 4-5 mm. longo, 5 mm. lato, tum in lobos 3 vulgo 1.2 cm. longos fissus ; lobi 2 majores late ovati, 8-9.5 mm. lati, tertius elliptico-lanceolatus vel ovato-oblongus, 5.5 mm. latus. *Petala* niveo-alba, reflexa, magna, obovata vel obovato-oblonga, apice rotundata, 2.2 cm. longa, 1.2 cm. lata. *Stamina* circiter 1 cm. longa. *Ovarium* ovoideo-subglobosum, stellato-tomentosum, 3-3.5 mm. longum, circiter 3.5 mm. diametro ; stylus 1.2-1.3 cm. longus, triente inferiore conspicue stellato-pubescent, ramis ad 1.5 mm. tantum longis. *Fructus* ovoideo-lageniformis, apice conspicue late obtuse acuminatus, basi rotundatus, 9-12.5 cm. longus, 6-7 cm. diametro, minute tomentellus, pericarpio circiter 4 mm. crasso ; semen ovoideum, 7 cm. longum, 4.7 cm. diametro, siccitate brunneum atque costis crebris flavis insigniter reticulatum.

Bartica-Potaro road, in sandy wallaba forests of the Essequibo-Mazaruni Divide : near 14th milepost, fl. August 18th, 1937, *Sandwith* 1124 ; near 25th milepost, fl. Sept. 1932, *Forest Dept.* 2315, 2316 (seedling leaves) ; near 27th milepost, fr. March 1937, *Forest Dept.* 2524.

A tree, about 100 ft. high and 1-2 ft. in diameter, the trunk ringed as in the allied species. Flowers numerous in each cluster, very showy, fragrant. Petals snow-white, reflexed, large. Filaments snow-white. T. A. W. Davis notes that the pulp round the seed is very pale yellow, paler than in the seed of *C. fragrans*.

***C. fragrans* Benth.** This species occurs in French Guiana, but—remarkably—has not yet been noted in Surinam. A synonym is *Guenetia macrosperma* Sagot ex Benoist in Bull. Mus. Hist. Nat. Paris, 25, 387 (1919), see Burret in Notizbl. Bot. Gart. Berlin, 9, 868 (1926). Burret's identification is confirmed by *Wachenheim* sine no., ann. 1921, Godebert, distributed recently to Kew from Paris.

ELAEOCARPACEAE.

Sloanea echinocarpa *Uitt.*

Kerimeru Creek, Berbice River, in wallaba bush on white sand, March 21st 1938, *Fanshawe* in *Forest Dept.* 2677 : tree 100 ft. high, 24 in. diam., with tall spreading buttresses.

Vernacular name, *Aruadan* (Arawak).

Distr. Surinam, hitherto regarded as endemic.

LINACEAE.

Ochthocosmus Barrae *H. Hallier*, forsan varietas vel species distincta.

Kaieteur Savannah, on rocky bushy ground close to the Falls, c. 1000 ft., Sept. 4th 1937, *Sandwith* 1338. A tree, 30–40 ft. high, with whitish-green petals.

The material, taken from a single tree, does not exactly match any American sheet of *Ochthocosmus* in the Kew Herbarium, but is certainly nearest to the material of *O. Barrae*, from which it differs in the more numerous main lateral nerves (about 10–14 on each side of the midrib) of the leaves, and the greater number of smaller crenae on the margins. No satisfactory distinguishing character has been found in the inflorescence. *O. Roraimae* Bth. has thicker leaves with shorter petioles, fewer crenae, and fewer main lateral nerves which are more arcuate and more steeply ascending, and longer petals. *O. parvifolius* H. Hall. is like a small-leaved edition of *O. Roraimae* with more numerous and straighter lateral nerves. Many more collections of American *Ochthocosmus* are required before the true diagnostic value of leaf-characters can be estimated ; and for this reason the writer refrains from describing yet another species from the evidence of a single collection.

LEGUMINOSAE.

Bowdichia racemosa *Hoehne.*

In somewhat open, sandy, forest between the Kaieteur Savannah and the Potaro River, Sept. 6th 1937, *Sandwith* 1393. A small tree, 25–30 ft. high. Leaflets rather thick and resembling leaves of box. Petals cream or very pale creamy-brown, brownish-pink in the lower half.

Distr. Lower Amazonian Brazil, and Matto Grosso.

Compared with *Ducke* 11443 and 24058, which differ in the shorter inflorescences, but intermediates will doubtless be collected. The first record from British Guiana.

Swartzia Davisii *Sandwith*, sp. nov. ; juxta *S. latifoliam* Benth. et *S. corrugatam* Benth. ponenda, inflorescentiis longis laxifloris, floribus omnibus partibus multo majoribus, pedicellis longioribus, pistillo omnino glabro primo visu distinguenda ; praeterea a *S. latifolia* forma foliolorum, nervis lateralibus numerosioribus differt.

Arbor parva, c. 12 m. alta ; ramuli hornotini, petioli, rhachis folii, petioluli pilis plus minusve patulis fulvis vel pullis lanato-

tomentosi. *Folia* imparipinnata, 9–11-foliolata, 17–38.5 cm. longa ; petiolus 2–5 cm. longus ; rhachis supra canaliculatus, exalatus, internodiis 1.5–4.5 cm. longis ; petioluli 1–4.5 mm. longi ; foliola ima ovato-elliptica, superiora oblonga vel obovato-oblonga, summa nonnunquam oblanceolata, terminalia elliptica vel obovato-elliptica, apice breviter late acute cuspidato-acuminata, basi cuneata usque rotundata, 2–19 cm. longa, 1.3–8.8 cm. lata, subcoriacea, supra siccitate olivacea nitidula costa vix elevata tomentosa ceterum glabra nervis primariis impressis, subtus siccitate pallidiora (statu vivo glaucescentia) costa nervisque primariis prominentibus fulvolanatis praeterea pagina tota satis dense suberecto-pilosula, nervis primariis utroque costae latere circiter 12 patulo-ascendentibus subrectis marginem versus arcuato-anastomosantibus, rete venularum supra impresso subtus intricato prominulo ; stipulae delapsae haud visae. *Inflorescentiae* e trunco infra folia exorientes, arcuato-flexuosae, ad 30 cm. longae, secus totam longitudinem laxiflorae, rhachi subadpresse fulvo-tomentosa, superne siccitate passim fulvo-griseae subnitentes ; bracteae facile delapsae, lanceolatae, concavae, 4–5 mm. longae, vix ad 2 mm. latae ; pedicelli ascendentes, 1.6–2.3 cm. longi ; bracteolae nullae. *Alabastra* ovoideo-subglobosa, apiculata, matura 1 cm. longa, circiter 8 mm. diametro, siccitate pallide fulvo-griseo-sericea plus minusve nitentia. *Calyx* in lobos 4–5 reflexos intus glabros siccitate rubro-brunneos fissus ; lobi ovato-lanceolati vel elliptico-lanceolati, 1.2–1.3 cm. longi, 5.5–7 mm. lati. *Petalum* pallide flavum, haud purpureo-venosum, ovato-suborbiculare, basi truncato-rotundatum, circiter 1.8 cm. longum atque latum, margine obscure sinuato-crenulato, extra secus dimidium inferius costae ac unguem dense flavo-pilosum, ceterum glabrum ; unguis vix 2.5 mm. longus. *Stamina* filamentis glabris ; majora 4–5, antheris 4–4.75 mm. longis. *Ovarium* lineari-oblongum, angustum, saepius curvato-falcatum, glaberrimum, 1–1.4 cm. longum, vix ad 2 mm. latum, in stylum glabrum crassum obtusum brevissimum circiter 1.5 mm. longum transiens ; stipes glaber, circiter 9 mm. longus. *Fructus* non visus.

BRITISH GUIANA. Malissa Creek, Berbice River, in mixed forest on sandy clay soil, March 4th 1938, *T. A. W. Davis* in *Forest Dept.* no. 2617 (typus). "Tree of taller undergrowth, 40 ft. high, 3 in. diam. Young shoots, inflorescence, rhachis and principal nerves of leaves with abundance of rusty hairs. Lower surface of leaves glaucous. Cauliflorous. Petal pale yellow, without purple veins. Calyx pale green with faint rusty tomentum on buds." *Ibid.*, in mixed bush on white sand, March 7th 1938, *Fanshawe* in *Forest Dept.* 2669.

This interesting species resembles *S. grandifolia* Bong. ex Bth. and *S. tomentosa* DC. in the facies of its leaves, but these are long-styled species with shorter anthers on the large stamens. The characters of the inflorescence of *S. Davisii* clearly relate it to *S. corrugata* Bth. and *S. latifolia* Bth., and no closer affinity has been

found, although relationship with *S. cardiosperma* Spruce ex Bth., *S. macrocarpa* Spruce ex Bth., *S. obscura* Huber and *S. melanocardia* Ducke may be indicated. This is the twentieth species of *Swartzia* to be recorded from British Guiana.

Heterostemon otophorus *Sandwith*, sp. nov. ; *H. mazarunensi* *Sandwith* affinis, stipulis maximis auriformibus, folii rhachide infra par foliolorum magnum evolutum alata multo longiore, foliolis pro rata latioribus rete venularum intricatiore, bracteis magis ovatis, floribus brevius pedicellatis differt.

Frutex riparius ; ramuli teretes, minute pubescentes. *Folia* paripinnata, foliolis primo visu unijugis sed revera ut in *H. mazarunensi* bijugis jugo inferiore sub internodio rhacheos alato omnino suppresso ; petiolus crassus cortice corrugato, 4-6 mm. longus ; internodium rhacheos 0.8-1.7 cm. longus, supra alatus atque canaliculatus marginibus alarum revolutis, prope apicem 2.5-4 mm. latus ; foliola jugi evoluti maxima petiolulis vulgo circiter 3 mm. longis, elliptico-oblonga vel obovato-oblonga, apice cuspidato-acuminata acuminem 0.6-1.5 cm. longo, basi ut in *H. mazarunensi* obliqua, 10-24 cm. longa, 3.9-8.8 cm. lata, glabra, integra, firme chartacea, nervis plus minusve ut in *H. mazarunensi* sed rete venularum supra intricatiore magis manifesto ; stipulae maximae, oblongae, erectae, apice rotundato-obtusae, basi conspicue oblique auriculato-cordatae, 2.5-5.5 cm. longae, 1.1-2.3 cm. latae, reticulatione foliolorum. *Racemi* haud dense pubescentes, multiflori, 3-14 cm. longi ; bractae ovatae, obtusae, pubescentes atque ciliatae, 3-4 mm. longae, 2-2.5 mm. latae ; pedicelli breves vel obscuri, ad 2 mm. longi ; bracteolae ut in *H. mazarunensi* prope medium vel supra connatae, pubescentes, 5-6 mm. longae, apicem versus circiter 4 mm. latae. *Calyx* tubo minute pubescente 1-1.2 cm. longo ; segmenta 4, extra indumento tubi induta, inaequalia, involuta, marginibus membranaceis glabrescentibus, oblongo-linearia vel fere obovato-oblonga, 1.65-2.2 cm. longa, 3.5-6.75 mm. lata. *Petala* alba, 3 magna obovato-oblonga vel ovato-oblonga, 2.2-3.2 cm. longa, 1.1-1.3 cm. lata, haud unguiculata, dimidio superiore conspicue dense ciliata ; petala 2 rudimentaria oblonga, minuta, 2-2.2 mm. longa, 1 mm. lata, apicem versus longe ciliata. *Tubus stamineus* glaber 1.4 cm. longus, filamentis ut in *H. mazarunensi* exorientibus, eis staminum 3 perfectorum prope medium longe pilosis ; antherae perfectae 4 mm. longae. *Ovarium* vel suturis pubescentibus ceterum glabrum (in exemplo typico) vel omnino tomentosum (in *Jenman* 7407), stipite brevi pubescente, stylo vel basin versus parcissime pilosulo vel (in *Jenman* 7407) tomentoso 1.4 cm. longo. *Legumen* non visum.

BRITISH GUIANA. Potaro River : Kangaruma, a small shrub with white petals in forest on river-bank, August 31st 1937, *Sandwith* 1241 (typus) ; riverside at Pakatuk, Oct. 1898, *Jenman* 7407 (forma ovario basique styli tomentoso).

As in *H. mazarunensis*, the three fertile stamens are found in the highest of the three lateral pairs and in the central terminal stamen at the apex of the sheath. Their filaments are thicker than those of the sterile stamens, and are sparsely long-pilose near the middle, but they are shorter than the filaments of the sterile stamens immediately below them. The shortest filaments are those of the lowest lateral sterile pair. Bentham and Hooker's description of the androecium of *Heterostemon* therefore needs an emendation, which has not yet been given in the Pflanzenfamilien.

The material of the present species, which is very closely allied to *H. mazarunensis*, shows that the morphology of the leaf of the latter was misinterpreted at the time of its description. The minute, extremely short, winged rhachis was inaccurately described as a stipel-like pair of leaflets similar to that occurring in *H. conjugatus* and *H. ellipticus*. The well-developed rhachis of the leaf of *H. otophorus* now reveals the true nature of this winged internode which re-appears in the curious imparipinnate *H. dispar*, and in the multifoliolate *H. mimosoides*.

The Kew material of *Heterostemon* may now be keyed as follows :
 Leaves paripinnate with numerous pairs of small leaflets ; rhachis winged.....*H. mimosoides*
 Leaves with 5 or fewer leaflets :

Leaves imparipinnate :

Leaves trifoliolate, the lateral leaflets minute and stipel-like, the terminal elliptic or elliptic-oblong and usually much more than 3 cm. broad.....*H. ellipticus*

Leaves 3-5-foliolate with conspicuously winged rhachis, the lateral leaflets at least 7 mm. long, the terminal oblong or oblong-lanceolate and less than 3 cm. broad.....*H. dispar*

Leaves paripinnate :

Leaves with 2 conspicuous pairs of leaflets separated by a long internode without definite wings.....*H. ingifolius*

Leaves with the lower pair of leaflets either suppressed or extremely reduced and stipel-like ; internode very short :

Stipel-like lower leaflets usually present. Internode hardly winged. Flowers very large, about 10 cm. long.....
H. conjugatus

Lower leaflets suppressed (in the material seen). Internode definitely winged. Flowers smaller, much less than 10 cm. long :

Stipules subulate. Internode only 3 mm. long.....
H. mazarunensis

Stipules very large and ear-like. Internode 0.8-1.7 cm. long *H. otophorus*

Pithecellobium Gonggrijpii *Kleinh.* in Rec. Trav. Bot. Néerl. 22, 414 (1925).

Hurihi, Kara-kara Creek, fr. Feb. 1910, *C. W. Anderson* in Forest Dept. no. 147. Demerara River, fl. July 1887, *Jenman* 3957,

noted as a small tree. Potaro River, a short distance above the Kaieteur Falls, fl. and fr. Sept. 1937, *Sandwith* 1378: a small tree by stream in high forest; petals pinkish-brown; stamens pure white.

Vernacular name, *Manariballi* (Arawak).

Distr. Surinam.

The material collected by Anderson agrees excellently with *Gonggrijp* and *Stahel* 4211, which is a fruiting collection cited by Kleinhoonte. The other two collections cited above are placed here because they appear to agree in all essential characters of leaves, flowers and fruit. It is believed that they were taken from small examples of a species which is often developed as a large tree. This might account for discrepancies such as the larger number of pinnae (5-8 pairs) and leaflets. It is significant that C. W. Anderson noted that the leaves of a young shoot of his collection were "very much larger than the top leaves of the tree"; in fact his material shows that they bear 7-8 pairs of pinnae with more numerous leaflets than those of the 4-5 pairs of the leaves of old shoots. It is possible, in the light of this evidence, that *P. Pullei* Kleinh., which was described as a small tree 10 m. high and resembles *P. Gonggrijpii* very closely, is not more than a form of the latter species with more numerous pinnae and somewhat more hairy corollas.

ROSACEAE.

Hirtella angustissima *Sandwith*, sp. nov.; *H. racemosae* Lam. speciei polymorphae affinis, ab omnibus ejus formis foliis angustissimis rigidis lanceolatis usque linearibus differt.

Arbor parva riparia, gracilis, pulcherrima; ramuli pilis adpressis vel ascendentibus plus minusve copiose induti; internodia 0.5-2.7 cm. longa. *Folia* pro genere angustissima, disticha, salicina, lanceolata usque linearia, apice longe sensim acuminata vel saltem attenuata, apice ipso obtuso, basin versus attenuata sed basi ipsa vulgo rotundata rarius cuneata, 5.5-18.5 cm. longa, 0.55-2.2 cm. lata, rigide chartacea vel coriacea, nitidula, oculo nudo glabra, sed revera subtus secus costam sparse pilosa, praeterea pagina inferiore pilis minimis e tuberculis exorientibus crebre pubescente, costa utrique prominula, nervis primariis utroque costae latere circiter 10-12 patulo-ascendentibus atque satis longe a margine arcuato-anastomosantibus supra fere planis subtus prominulis, supra nonnunquam cum reticulatione omnino impressis; petiolus pilosus, 2-3.5 mm. longus; stipulae subulatae, 3-4 mm. longae, juventute pilosae. *Racemi* penduli, 8-22 cm. longi, copiose pilosuli atque puberuli, triente vel fere dimidio inferiore nudi sed stipulis bracteisque praediti; pars florifera circiter ad 3 cm. lata; bractae lineari-subulatae, 1-1.5 mm. longae, dense pubescentes; pedicelli 8.5-11 (vulgo 10) mm. longi, indumento rhacheos praediti; bracteolae infra medium pedicellum minutae, ovatae vel oblongae, obtusae, circiter ad 0.6 mm. longae atque latae, nonnunquam minimae

suborbiculares, apice glandula magna sessili terminatae. *Calycis* tubus vix 2.5 mm. longus, 1.5 mm. latus, indumento pedicelli praeditus; lobi ovato-lanceolati vel elliptico-oblongi, 3.5–4 mm. longi, 2 mm. lati, extra pubescentes intus dimidio superiore subsericei. *Petala* amethystino-caerulea, elliptico-oblonga, ad 5.5 mm. longa, fere 3 mm. lata, glabra. *Stamina* 4–5, 1.8–1.9 cm. longa, glabra. *Ovarium* dense pilosum; stylus prope basin sparse pilosus, ceterum glaber, 2 cm. longus. *Fructus* ignotus.

BRITISH GUIANA. Potaro River: Amatuk Falls, on rocky ground, Aug. 31st 1937, *Sandwith* 1246 (typus), *ibid.*, Aug. 1933, *Tutin* 601; below Kaieteur Falls, on rocks and banks in the riverway, Sept.–Oct. 1881, *Jenman* 884, 970. A small tree, 15–20 ft. high, very graceful. Racemes pendent. Petals and filaments *Veronica* or *Echium* blue.

This very beautiful species occurs abundantly along the banks of the Potaro from Tukeit down to Kangaruma, and is so striking and so uniform that it has seemed undesirable to treat it as a mere extreme variety of the polymorphic *H. racemosa*.

MELASTOMACEAE.

Ernestia cataractae *Tutin* in Journ. Bot. **72**, 308 (1934).

Kaieteur Savannah, on open rocky ground near the Resthouse and Falls, Sept. 2nd, 1937, *Sandwith* 1294: leaves grey-green above; petals a delicate pale pinkish-mauve.

Possibly owing to a more favourable season this material is far finer than that of the type collection, presenting a more floriferous inflorescence and larger flowers, the petals and filaments being sometimes up to twice as long as in *Tutin*'s description. The anthers of this collection are abortive and therefore much shorter than the healthy anthers of *Tutin*'s type. It is interesting to note that this species was collected here long ago by *Jenman*, who, indeed, missed very few of the Kaieteur Savannah plants during his fortnight's stay there. A specimen (without number) has been discovered in the Kew Herbarium, attached to a sheet of *Comolia purpurea*.

Clidemia pycnaster *Tutin* in Journ. Bot. **72**, 306 (1934).

Sandy ground in high forest skirting the Kaieteur Savannah, Sept. 7th 1937, *Sandwith* 1426: shrub with tawny indumentum on branchlets, and strongly toothed leaves; petals dirty white with a longitudinal medium pinkish-mauve line.

Compared with the type collection (*Tutin* 684) which was a small bush growing on the open rocky ground of the Savannah. There seems no doubt that the two collections are conspecific although they represent strikingly distinct ecological forms, *Sandwith* 1426 differing from the type in the larger, ovate-lanceolate, toothed leaves with scattered long simple hairs among the stellate indumentum of the upper surface, and in the larger flowers.

Sabicea velutina Benth. ; neque Wernham neque Bremekamp.

The holotype of this species, collected by Schomburgk on Mt. Canaupang, was made the holotype of a new species, *S. guianensis* Wernh.—itself a later homonym of *S. guianensis* (Aubl.) Baill.—by Wernham! *S. leucotricha* Krause, described from the same region, is also almost certainly a synonym. The very different and less local plant to which Wernham and Bremekamp applied the name *velutina* is thus left without a specific name, when we examine the synonymy of those authors. The present writer, however, believes that this plant does not differ specifically from *S. glabrescens* Benth., from which it appears to be distinguished only by the addition of an arachnoid tomentum on the branchlets and the lower surface of the leaves. Collections intermediate between the two have been observed, see Britton and Britton 2229 from Trinidad, Martyn 313 from British Guiana, Ule 8336 from the Rio Branco. *S. trinitensis* Standley should also be treated as a synonym of *S. glabrescens*. The plant which has been incorrectly identified with *S. velutina* Bth. may be treated as follows :

Sabicea glabrescens Bth. var. **oblongifolia** (Miq.) Sandwith, comb. nov., descr. emend. ; a typo ramulis folisque subtus praeter venas pilosas arachnoideo-tomentosis insigniter discedens.—*S. velutina* Bth. var. *oblongifolia* Miq. in *Linnaea* 18, 615, 735 (1844). *S. velutina* Bth. sec. Wernham, Mon. *Sabicea*, p. 49 (1914), cum syn. ; sec. Bremekamp in Pulle, Fl. Surinam, 4, 145 (1934), cum syn. ; non Benth.

Distr. British Guiana, Surinam, Venezuela (fide Bremekamp).

Malanea sarmentosa Aubl.

Mazaruni Station, among bushes in sandy burnt bush, Aug. 22nd 1937, Sandwith 1163. A low shrub. Leaves rugose with revolute margins. Corolla creamy-yellow, limb whitish-woolly within.

This agrees excellently with the material from French Guiana, Surinam and Trinidad which has been compared with Aublet's type, and not with other sheets from British Guiana which were named *M. sarmentosa* by Bentham and Schumann but which lack the distinctive indumentum and rugosity of the leaves and perhaps represent a glabrescent variety.

Faramea egregia Sandwith, sp. nov. ; *F. quadricostatae* Brem. affinis atque *F. spathaceae* Müll. Arg. ex Standley subsimilis, ab illa foliis longe petiolatis, floribus aut in axillis penultimis geminis vel solitariis aut apice ramuli ternis, calyce cum ovario multo longiore, ab hac aristis stipularum multo longioribus, petiolis longioribus, floribus haud longipedicellatis, corollis multo majoribus differt.

Frutex vel arbor parva, glabra ; ramuli compressi acute tetragoni lateribus concavis majoribus costato-striatis. *Folia* conspicue petiolata, oblanceolata vel elliptico-oblonga, apice longe ad 2 cm.

angustissime insigniter caudato-acuminata, basi acute cuneata, 12–17.5 cm. longa, 2.5–5.2 cm. lata, chartacea, supra nitidula siccitate viridia, subtus pallidiora siccitate griseo-viridia, costa utrinque prominente, nervis primariis utroque latere costae circiter 11–13 arcuato-ascendentibus et anastomosantibus, rete venularum supra inconspicuo subtus manifesto; petiolus 1–1.5 cm. longus; stipularum vagina 1.5–2.5 mm. longa, arista 4–6 mm. longa. *Inflorescentiae* in axillis penultimis apice ramulorum brevium singulorum vel saepius geminorum superpositorum ex internodio singulo pedicelliformi constitutorum sessiles uniflorae, stipulis foliisque valde reductis minutis subulatis bracteoliformibus ita suffultae ut flores singulos vel geminos longipedicellatos axillares simulent, raro apice rami ordinarii annotini terminales ternae; internodium sub flore pedicelliforme 2.2–4.2 cm. longum; stipularum aristae sub flore vulgo ad 0.5 mm. (raro 1.5 mm.) longae; folia reducta bracteoliformia vulgo aristiformia 1.5–2 mm. longa, raro subfoliacea elliptica atque caudato-cuspidata 8 mm. longa 2 mm. lata. *Calyx* cum ovario turbinato-campanulatus, ovario incluso 8–10 mm. longus, ipse fere 6 mm. longus, 5 mm. latus, truncatus, ore integro. *Corolla* hypocrateriformis, alabastro viridescens, sub anthesi cremeo-alba, pro genere magna speciosa; tubus 2–2.2 cm. longus, apice 4 mm. latus; lobi expansi valde crassi, recurvo-falcati, 2.5–3 cm. longi, statu plicato basi ad 3 mm. lati. *Stamina* supra medium tubum affixa, filamentis circiter 1.5 mm. longis, antheris 9–9.3 mm. longis. *Discus* annularis, 0.6 mm. altus. *Stylus* glaber, 5.3 mm. longus, lobis circiter 1.6 mm. longis. *Fructus* ignotus.

BRITISH GUIANA. Potaro River: in the deeply wooded gorge about 1 mile below the Kaieteur Falls, September 11th 1937, *Sandwith* 1498. A small tree, frequent on rich humus in a patch of mora forest. Corolla greenish in bud, whitish-cream when open; lobes of the limb very thick, recurved-falcate when fully expanded.

This interesting species is remarkable for the morphology of the extremely reduced one-flowered inflorescences which terminate short lateral shoots composed of a pedicelliform internode, the single large flower being supported at the base by bract-like reduced stipules and leaves. These shoots appear at the penultimate nodes of the branch with the new year's growth, the uppermost internode being normally vegetative and terminated by a pair of fully developed leaves. In a single instance the old growth of a branch is terminated by three young shoots ending in an inflorescence. The short lateral inflorescence-bearing shoots are usually superposed in opposite pairs, corresponding to the serial buds known in the *Rubiaceae*. Similar pairs of lateral short shoots can be observed in *F. occidentalis*, in which the lower shoot bears an inflorescence. In *F. spathacea* Müll. Arg. ex Standley the pseudo-axillary flowers are borne on a long true pedicel. It is believed that Bremekamp's key in Pulle's Flora of Suriname, which divides species by the position of the inflorescence at the end either of ordinary shoots or of

short opposite lateral shoots, must be used with considerable caution.

***Psychotria racemifera* Standl.**

Malissa Creek, Berbice River, on clay by creek in morabukea forest and in burnt bush on ironstone hills, abundant, March 7th 1938, *Fanshawe in Forest Dept.* 2668: creeping, rooting at nodes; flowers surrounded by pink bracts, white. Itabru Fall, Berbice River, in low bush on clay soil, March 5th, 1938, *Forest Dept.* 2668 A.

Distr. Amazonian Brazil and Peru, Venezuela, Colombia.

***Perama scaposa* Gleason et Standley.**

Kaieteur Savannah, in damp mossy spots among boulders by rivulet, 1200 ft., Sept. 9th 1937, *Sandwith* 1353. Flowers minute, whitish-blue. Near Kaieteur Falls, Aug. 20th 1933, *Tutin* 496. Sand-reef at head of Hooroobea Creek, S.E. of Georgetown, Nov. 1919, *Hitchcock* 16951, det. Bremekamp. Without locality, *Robert Schomburgk* 34 of "last small set."

Distr. Mt. Duida, Venezuela. Schumann's record, in Mart. Fl. Bras., of *P. dichotoma* Poepp. et Endl., as collected by Schomburgk, must presumably be referred here.

COMPOSITAE.

***Mikania Sprucei* Baker.**

Kaieteur Savannah, climbing over small trees on rocky ground near the Falls, c. 1200 ft., Sept. 6th 1937, *Sandwith* 1400.

Distr. Amazonian Venezuela.

This agrees well with the type, much better than with that of *M. roraimensis* Robinson which Robinson contrasted with *M. Sprucei*, admitting the close affinity of the two. Baker's description was inaccurate, the heads of *M. Sprucei* being shortly pedicellate, but the stalks are much shorter than those of *M. roraimensis*, which has the inflorescence and involucreal scales glabrous, whereas those of *M. Sprucei* are conspicuously glandular. Again, Baker's description of the corolla was wholly misleading, his "limb" no doubt representing the campanulate apex, which is slightly shorter (1.5 mm.) than the tube (2 mm.). The achenes vary in length according to development and maturity. *M. roraimensis* may prove to be not more than a variety of *M. Sprucei* which it resembles very closely.

ERICACEAE.

***Orthaea pendula* Tutin in Journ. Bot. 72, 335 (1934).**

Specimens collected at the type locality, Amatuk Portage, Potaro River, on Aug. 31st 1937, by N. Y. Sandwith (no. 1252) show that the characters distinguishing the type from *O. apophysata* (Griseb.) A. C. Smith are not maintained. The corollas of *Sandwith* 1252 are 2.3 cm. long, and the material agrees with that from Trinidad in all other respects except that the petiole is shorter than that of most Trinidad specimens. A. C. Smith, however,

described the petiole of *O. apophysata* as only 3–5 mm. long. The plant is frequent at Amatuk Falls and is a scrambling tree, forming a climber over others, to the height of about 30 ft.

EBENACEAE.

Diospyros ierensis Britton in Bull. Torr. Bot. Club, 48, 336 (1921).

Near Barabara Creek, near 14th milepost of Bartica-Potaro road, Aug. 18th 1937, *Sandwith* 1123 (♂ fls.) : a large tree, 1 ft. 6 in. diam., in wallaba forest on white sand; bark blackish, thinly longitudinally many-furrowed; heartwood fairly pale yellow; calyx orange-yellow after fall of corolla; corolla tube greenish-white; lobes of limb reflexed, pale yellow, turning brown.

Kamwatta Creek, Koirimap River, Pomeroon River, July 1918, *Hohenkerk* in *Forest Dept.* no. 109 A (♂ fls. and fr.). Upper Demerara River, Sept. 1887, *Jenman* 4003 (♂ fls. only).

Vernacular name, *Barabara* of wallaba (Arawak).

Distr. Trinidad: forest near summit of Mt. Tocuche, *Britton, Hazen* and *Mendelson* 1243 (fr., type in New York Herb.); Guanapo, *Dannouse* in *Herb. Trin.* 6415; Aripo road, near end of forest, *Broadway* 7593.

The British Guiana material agrees well with that from Trinidad and Britton's rather meagre description may be emended as follows:—*Young twigs* more or less adpressed-pubescent. *Leaves* 2.5–6.5 cm. wide, often somewhat shining above, when young pubescent on the midrib beneath and with minute scattered hairs on the lower surface, the midrib impressed and canaliculate above, prominent beneath, main lateral nerves about 10 on each side of the midrib, arcuate-ascending and anastomosing, reticulation intricate on both surfaces. *Inflorescence* rusty-tomentose, 1–3-flowered, very short; primary bracts narrowly boat-shaped, up to 4.5 mm. long. *Male* flowers only seen, described from *Sandwith* 1123. *Calyx* rusty brown when dried, densely adpressed-pubescent; tube top-shaped below, abruptly widened at the apex into the lobes, 5–6 mm. long, up to 6 mm. wide in the lower part; lobes 4–5, ovate, with undulating margins and very strongly thickened and raised triangular-lanceolate sericeous midribs within, 5–7 mm. long, 3.5–7 mm. wide. *Corolla* tube urceolate-cylindric, 11–12 mm. long, 5–6 mm. diam., finely sericeous outside; lobes 4–5, spreading and recurved, fleshy, ovate, blunt, 4.8–5.5 mm. long, 4–4.5 mm. wide, glabrescent outside, glabrous within, keeled beneath with a fleshy midrib. *Stamens* 12, inserted at the base of the corolla tube, often geminate; filaments densely pilose, 1.2–2.3 mm. long; anthers glabrous, about 3 mm. long including the long triangular-subulate produced portion of the connective which is 0.5 mm. long. *Ovary* rudiment densely tomentose with pale hairs. *Fruit* (in *Forest Dept.* 109A) globose, about 4.3 cm. diam.; fruiting calyx persistent, 3.3 cm. across, the lobes with conspicuous wrinkles on the outer surface descending for a short distance from the margin.

D. ierensis is apparently a member of the section *Paralea*, and related to *D. Ebenaster* Retz.

Four species of *Diospyros* are now recorded from British Guiana, and may be keyed as follows:—

Leaves narrowly lanceolate, glabrous, dark and veinless above, shining sericeous-tomentose with yellowish-white hairs beneath

D. dichroa Sandwith

Leaves not as above:

Leaves rounded and shallowly cordate at the base. Stamens 4.

D. lissocarpoides Sandwith

Leaves not cordate at the base. Stamens more than 10:

Branchlets, margins and lower surface of leaves with a deciduous rufous-brown tomentum. Filaments glabrous. Fruit

2.5–3 cm. diam.....*D. guianensis* (Aubl.) Gürke

Branchlets and leaves without a deciduous rufous-brown tomentum. Filaments pilose. Fruit 4.3 cm. diam.....

D. ierensis Britton

APOCYNACEAE.

***Aspidosperma Vargasii* DC., det. Fr. Markgraf.**

Kumuparu, Demerara River, on white sand with mixed low bush, Oct. 20th 1937, *FanShawe* in *Forest Dept.* 2536: tree 100 ft. high with little latex and no buttresses; buds white; open flowers with a faint mauve flush.

Dist. Venezuela.

***Forsteronia Sandwithiana* Woodson** in *Ann. Missouri Bot. Gard.* 22, 209 (1935).

Synonymous with this species are *Thenardia*? *corymbosa* Benth., *Forsteronia Schomburgkii* DC. excl. var., non (Bth.) Müll. Arg., and *Thyrsanthus corymbifer* Miers. Of these the epithet of the first was preoccupied in *Forsteronia*, while the second was an illegitimate name, since de Candolle included under it a variety which was based on the earlier name *Apocynum umbellatum* Aubl. Woodson has made a curious error in placing these three names as synonyms of the taxonomically distinct *F. umbellata* (Aubl.) Woods. The Schomburgk type (no. 277) of *Thenardia corymbosa* Bth., not cited by Woodson, agrees, as might be expected, with the material placed by him under *F. Sandwithiana*. Since the epithet of the third synonym, *Thyrsanthus corymbifer* Miers—a name based on the other two, and on *Schomburgk* 277 (sphalm. 247) as type—is not preoccupied in *Forsteronia*, it must take precedence over the superfluous name *F. Sandwithiana* and the following combination becomes necessary:

***Forsteronia corymbifera* (Miers) Sandwith**, comb. nov.—*Thyrsanthus corymbifer* Miers, *Apoc. S. Am.* 98 (1878). *Thenardia*? *corymbosa* Bth. *Forsteronia Schomburgkii* DC., excl. var. *F. Sandwithiana* Woodson.

GENTIANACEAE.

Coutoubea humilis *Sandwith*, sp. nov. ; statura humili, habitu repente radicante, forma foliorum in petiolum manifestum attenuatorum, racemo brevissimo foliis superioribus multo brevior, floribus congestis parvis, corollae lobis obtusis distinctissima.

Herba glabra, riparia, tenera, humilis, 6–20 cm. alta, repens, caulibus saepe inferne decumbentibus atque nodis radicantibus et ramulos novellos sursum emittentibus ; caules floriferi tetragoni, ad 2 mm. diametro, crebre vel parce foliati, internodiis 0·4–5·8 cm. longis. *Folia* lanceolato-elliptica usque elliptica, apicem versus attenuata vel acuminata, acuta, basi attenuata acute cuneata et in petiolum distinctum conspicuum circiter ad 10 mm. longum sensim decurrentia, lamina 3–10 cm. longa, 0·6–2·8 cm. lata, chartacea, supra nitidula, nervis supra obscuris planis vel impressis, subtus manifestis prominulis, nervis primariis utroque costae latere 3–4 tantum sursum arcuatis et longe a margine (in foliis majoribus nervo limbali duplici connexis) anastomosantibus, venulis obscuris. *Racemus* terminalis 0·5–2 cm. longus, ad 1·5 cm. latus, fere a basi florifer, foliis superioribus multo brevior, floribus congestis decussatis circiter 5–25 ; bractee lanceolatae, parvae sed haud spinuliformes, inferiores ad 2 mm. longae, ceterae circiter 1·2 mm. longae ; pedicelli brevissimi crassi, ad 0·75 mm. longi, nonnunquam fere ad 1·5 mm. lati ; bracteolae minutae, dimidio inferiore ovatae, superiore subpungenti-subulatae, ad 1 mm. longae. *Flores* 6–7 mm. longi. *Calycis* tubus campanulatus, 1·2 mm. longus, 2·5 mm. latus ; lobi lanceolato-ovati, subpungenti-acuminati, 3–3·5 mm. longi, basi 1·75–2 mm. lati. *Corolla* viridescenti-alba ; tubus 2·75–3·2 mm. longus et 1·75 mm. diametro ; lobi ovato-lanceolati, 3–3·2 mm. longi, fere 1·6 mm. lati, apice obtusi. *Stamina* prope tubi apicem inserta, filamentis 2–2·5 mm. longis, antheris circiter ad 1·3 mm. longis e flore expanso exsertis. *Ovarium* anguste ovoideum, 3 mm. longum, 1·5 mm. diametro, in stylum stigmati incluso 3 mm. longum attenuatum ; stigmatis lobi oblongi, 1 mm. longi, 0·5 mm. lati. *Capsula* ovoideo-ellipsoidea, 6–8 mm. longa, 3–3·75 mm. diametro, calycem longe excedens.

BRITISH GUIANA. Potaro River : swampy forest on left bank about 1–2 miles above the Kaieteur Falls, Sept. 6th, 1937, *Sandwith* 1386 (typus) ; Sheenabowa, Sept.–Oct. 1881, *Jenman* 1288 ; Waratuk portage, in shade on sandy soil among large stones and boulders, Sept. 12th 1937, *Sandwith* 1509. Essequibo River—Upper Demerara River : Kumuparu Creek, edge of low swamp, Oct. 30th 1937, *Forest Dept.* no. 2547. Trailing herb, usually with procumbent stems rooting at the nodes. Flowers greenish-white.

SOLANACEAE.

Solanum coriaceum *Dun.* Hist. Solan. 197, t. 14 (1813) ; *Poir.* in Lam. Encycl. Suppl. 3, 769 (1813) ; *Dun.* in DC. Prodr. 13, part i, 231 (1852).

FRENCH GUIANA. Coll. *Poiteau* in Herb. Gay., cum fruct., distr. as *S. spicatum* Poit.

BRITISH GUIANA. Near Rockstone, April 1899, *Jenman* 7544. Rockstone, Sept. 1905, *Bartlett* in *Jenman* Herb. 8204. Camaria Road, June 1911, *Kortright* in *Jenman* Herb. 144. Mazaruni Station, in mixed-greenheart forest, fl. and fr. Sept. 25th 1937, *Sandwith* 1591.

This remarkable species is a gigantic bush-rope reaching the forest canopy; the trunk of the rope is prickly, while the branchlets and midrib of the lower leaf-surface are clothed with short recurved prickles. The corolla is amethyst-violet, with yellow anthers. The young fruit is green, turning black when dried in the sun, 1.5–1.8 cm. in diameter.

SCROPHULARIACEAE.

Caconapea sessiliflora (*Bth.*) *Pennell*. *Herpestis sessiliflora* Bth.

Mazaruni Station, on bare damp sandy track in burnt bush, Sept. 14th 1937, *Sandwith* 1522. Erect herb. Corolla very pale, whitish with lilac tinge.

Distr. Mexico, Panama, Cuba, Guiana, Brazil. Apparently first record from British Guiana.

PEDALIACEAE.

Sesamum radiatum *Schum.* in *Schum. et Thonn.*, *Beskr. Guin. Fl.* 282 (1827).

The whole of the Guiana material at Kew (*Schomburgk* 742 (1322), *Jenman* 1504, *Sandwith* 1038 from Mazaruni Station, *Samuels* 495) is to be referred to the above species rather than to *S. indicum* (*S. orientale*) on account of the shape of the stem leaves, the larger and darker-coloured corollas, the shaggy-haired capsules and the wrinkled seeds. This is of interest since other Surinam material is referred in *Pulle's Flora* (4, 112) to *S. indicum*, the seeds being correctly described as smooth. The colour of the flowers of *Sandwith* 1038, from grassy places near Mazaruni Station, was a pale, foxglove-like, pinkish-purple.

LORANTHACEAE.

Psittacanthus lasianthus *Sandwith*, sp. nov.; in *Sect. Glossidea* juxta *P. biternatum* (*Hoffm.*) *G. Don* et *P. glaucocomam* *Eichl.* ponendus, propter tepala extra permanifeste floccoso-tomentosa distinctissimus.

Frutex parasiticus; ramuli subteretes, cortice longitudinaliter rugoso, papillis conicis dense obtecti; internodia 1.5–3 cm. longa. *Folia* opposita, elliptica, obovato-elliptica vel nonnunquam suborbicularia, apice rotundata, basi in petiolum crassum 5–10 mm. longum attenuata vel rotundata, 2.5–5.7 cm. longa, 2.2–4.2 cm. lata, juniora glauca, adulta rigide coriacea, nervis fere semper occultis haud vel vix distinguendis, ubique crebre papillosa.

Inflorescentiae in quaque axilla singulae vel binae, semel dichotome cymosae atque ternationes (rarius binationes) binas gerentes, rarius simplices binationem singulam gerentes, siccitate pruinoso-purpurascens, dense spinuloso-papillosae; pedunculus 0.5–1.3 cm. longus; rami dichotomiae 0.6–1.1 cm. longi; bractae connatae, patelliformi-cupulares; pedicelli 0.5–1 cm. longi. *Cupula* aperte cyathiformis, calyculi dimidium vel ultra aequans, margine irregulariter sinuato, 2 mm. alta, 4–5 mm. diametro, extra papillis pilisque papillosis dense vestita, siccitate rubra. *Calyculus* campanulatus, 3 mm. altus, 4.5–5 mm. latus, margine patulo pilis papillosis vestitus, ceterum glaber sed sub lente forti ubique minutissime granulosus. *Perigonium* alabastro tubulosum, extra intense scarlatinum, et breviter spinuloso-papillosum et pilis simplicibus sub lente spinuliformibus dense perconspicue floccoso-tomentosum, intus superne aurantiaco-flavum glabrum, infra insertionem filamentorum usque basin papillosum. *Tepala* 6, 4–4.3 cm. longa, circiter 3 mm. lata, alabastro arcte cohaerentia, flore aperto supra medium patula, marginibus conspicue sinuato-crenatis, alternatim obtusa et acuta, apice dorso gibboso-incrassata, intus prope basin (basinque filamentorum) ligula ovata obtusa margine obscure lacerata 2–2.5 mm. longa circiter 2 mm. lata instructa. *Stamina* paullo supra medium perigonium inserta, flava; longiora filamentis liberis glabris 1.35 cm. longis, antheris 5–5.3 mm. longis; breviora filamentis liberis glabris 9 mm. longis, antheris ad 6.75 mm. longis, connectivis apice conspicue fere ad 1.5 mm. productis. *Stylus* 3.8–4 cm. longus, inferne papillosus superne glaber, stigmatibus minute dense granulosus. *Fructus* ovoideo-ellipsoideus, apice truncatus, fere ad 1 cm. longus, 6–7 mm. diametro.

BRITISH GUIANA. Kaieteur Savannah, Potaro River, c. 1200 ft., scrambling on trees in a thicket on rocky ground, Sept. 5th, 1937, *Sandwith* 1366 (typus). *Ibid.*, Sept.–Oct. 1881, *Jenman* 1204. Perianth deep scarlet, furry-tomentose on the back, orange-yellow within the spreading upper half of the tepals. Stamens yellow. Younger leaves glaucous.

An outstandingly distinct and very beautiful species, evidently allied to *P. biternatus* and *P. glaucocoma*, and especially to the former which it approaches in the shape of the leaves and the conspicuously papillose branchlets.

EUPHORBIACEAE.

Phyllanthus vacciniifolius (Müll. Arg.) Müll. Arg.

Kaieteur Savannah, in thickets on dry stony ground, c. 1200 ft., Sept. 3rd 1937, *Sandwith* 1315. A small, delicate tree with wavy spreading branchlets. Leaves greyish-green beneath. Tepals and fruit brownish-red.

Hitherto recorded only from Roraima and Duida at about 4000–5500 ft.

BROMELIACEAE.

Navia angustifolia (Bak.) Mez, det. L. B. Smith.

Kaieteur Falls, on the face of cliffs and under boulders at the summit of the precipices near the head of the Falls, Sept. 1st–8th, 1937, *Sandwith* 1285: petals white; anthers yellow; stigmas 3.

Hitherto known only from the type collection, *Appun* 1055, from Marima.

Pitcairnia maidifolia (Morr.) Dcne.

Kaieteur Savannah, in open burnt forest fringing the savannah, close to the Potaro River, Sept. 6th 1937, *Sandwith* 1388. Spike very stiff. Bracts deep scarlet except in the green upper third. Petals greenish-white below, white above.

New to British Guiana and a remarkable extension of the known range, since the nearest locality recorded by Mez (1935) is Caracas.

Guzmania Altsonii L. B. Smith.

Kaieteur Savannah, in wood between the Falls and Resthouse, and elsewhere in thickets (neighbourhood of type locality), c. 1200 ft., Sept. 9th, 1937, *Sandwith* 1447: terrestrial; stem and bracts wholly green; fruit dark olive-green.

The above collection shows that the leaves of this species may reach 6 cm. in breadth, while the apiculate fruiting capsule somewhat exceeds 2 cm. in length.

RAPATEACEAE.

Potarophytum *Sandwith*, gen. nov.; in clavi cl. Pilgeri (vide Engl. et Prantl, *Pflanzenfam.*, 2 Aufl., 15 A, p. 62) prope *Schoenoccephalum* Seub. et *Monotrema* Koern. ponendum, ab ambobus bracteis involucri 4, praeterea ab illa antheris apice poro simplici apertis, ovarii loculis uniovulatis, ab hac bracteis sepalisque pungenti-mucronatis, ovulis angulo centrali affixis statim distinguitur; *Windsorina* Gleason verisimiliter proxima, structura inflorescentiae floribusque paucis longe abhorret.

Herba glabra riparia, typice *Rapateacea*. *Pedunculi* axillares, in quaque axilla ut videtur solitarii (vel nonnunquam bini?). *Inflorescentia* terminalis, caput hemisphaericum formans; involucri bracteae 4, liberae, imbricatae, basin capitis arcte amplexantes, breves, horizontaliter patentés, caput vix superantes. *Flores* valde numerosi, densissime congesti, in receptaculo brevi ut videtur sessiles. *Bracteae* florales 6, erectae, imbricatae, subaequales, apice pungenti-acuminatae. *Sepala* 3, libera, bracteis subsimilia sed latiora. *Petala* 3, maturitate spatulata, libera, parva, flava. *Stamina* 6, filamentis liberis planis, antheris quadrilocularibus lineari-lanceolatis exappendiculatis, loculis exterioribus super interioribus elongato-attenuatis et poro simplici terminali obliquo apertis. *Ovarium* subglobosum, conspicue trigonum, triloculare, apice lobis rotundatis trilobatum; ovula in quoque loculo solitaria, angulo centrali affixa. *Capsula* ovoideo-lageniformis, prope medium

constricta, dimidio superiore trigona lateribus concavis, apice conspicue triloba lobis rigidis corniformibus sinu angusto profunde oblongo sejunctis. *Semina* subglobosa, testa alba dense minute granulosa, apice appendice applanata rostriformi excentrica mox caduca instructa.

Potarophytum riparium *Sandwith*, sp. nov. adhuc unica.

Herba terrestris, acaulescens, circiter 1 m. alta, e vaginis bracteisque involucris gluten mucilaginosum familiae typicum emittens. *Rhizoma* 3 cm. diametro, fibris sulcatis 3 mm. diametro praeditum. *Folia* more familiae compluria, circiter 1 m. longa, supra vaginas conspicue (hic 7–8 mm. lata) constricta, sed statim in laminas transeuntia; vaginae 26–30 cm. longae, 2.2–2.6 cm. latae, costa excentrica; laminae siccitate laete flavo-virides, 4.8–6.3 cm. latae, apicem versus longe anguste attenuatae, firme chartaceae vel subcoriaceae, integrae, inermes, costa subtus valde prominente, nervis longitudinalibus venulisque transversis utrinque prominulis. *Pedunculus* circiter 28–45 cm. longus, basi squamis vaginantibus inaequalibus scariosis ad 7 cm. longis praeditus, apice sub capite ad 7 mm. dilatatus. *Involucris* bractearum 4 (an nonnunquam 5?) ovatae, apice breviter obtuse acuminatae, basi rotundatae, inaequales, majores 1–1.8 cm. longae, 0.9–1.2 cm. latae, nervis longitudinalibus circiter 6 reticulatione laxa irregulari connexis. *Caput* hemisphaericum, ad 1.5 cm. altum, 2.3–2.9 cm. diametro, receptaculo circiter 3 mm. tantum alto. *Flores* circiter 9 mm. longi; bractearum circa flores adpressae, lanceolatae, concavo-cymbiformes, 6 mm. longae, applanatae 2–2.3 mm. latae, dorso conspicue uninerviae, in apicem incrassatum pungentem per 0.75–1.2 mm. solidum acuminatae. *Sepala* ovata, acuminata, 6.2–6.5 mm. longa, 3–3.2 mm. lata, valde concava, pallide viridi-straminea, in apicem pungentem illi bractearum similem sed multo brevior attenuata. *Petala* spathulata, tota 8.75–9.2 mm. longa; unguis 5 mm. longus, 1.8 mm. latus, striis longitudinalibus circiter 10 albis praeditus; lamina flava, obovato-elliptica, apice rotundata, 3.75–4 mm. longa, 2.5–2.75 mm. lata. *Staminum* filamenta fere 6 mm. longa, glabra; antherae 2.5 mm. longae, 0.6 mm. latae. *Ovarium* 1.5 mm. longum atque diametro; stylus 7 mm. longus, stigmatibus haud distinguendo. *Capsula* 5–6 mm. longa, 3 mm. diametro, sordide alba, nitidula, lobis apicalibus 1 mm. longis. *Semina* ad 1.75 mm. longa, 1.5 mm. diametro; appendix rostriformis facile caduca, alba, minute furfuraceo-puberula, circiter 1 mm. longa.

BRITISH GUIANA. Potaro River: Kaieteur Falls, in deep shade by a stream in forest descending from the savannah to the river, near the head of the Falls, c. 400 m., September 5th 1937, *Sandwith* 1382. Petals small, yellow.

This plant presents a completely new combination of several of the interesting characters distributed among the genera of this family, and it is somewhat difficult to suggest its closest affinity, whether on the grounds of mere facies or of technical features.



Fig. 1. *Potarophytum riparium* Sandwith. 1, portion of plant, $\frac{1}{2}$ nat. size ; 2, an inflorescence, with top of peduncle, nat. size ; 3, a flower, with bracts, $\times 4$; 4, sepals, $\times 4$; 5, a petal, $\times 4$; 6, a stamen, $\times 4$; 7, an anther, $\times 8$; 8, gynoecium, $\times 8$; 9, part of immature capsule, showing attachment of ovules, $\times 6$; 10, capsule at dehiscence, $\times 6$; 11, seed, $\times 8$.

Moreover, the Pacaraima Range, on the edge of the escarpment of which it occurs, may be said to be the headquarters and perhaps even the centre of distribution of the *Rapateaceae*. Of the five genera occurring in the Potaro valley or on the Kaieteur Savannah, viz. *Rapatea*, *Stegolepis*, *Saxofridericia*, *Spathanthus* and *Windsorina*, the only two with which a casual glance could associate this plant are *Rapatea* and *Saxofridericia*. Of these *Rapatea* is of course distinguished by its normally 2, erect, spathe-like involucre bracts, the united sepals and petals, and the appendiculate anthers; while *Saxofridericia* differs in its 2 connate, splitting, involucre bracts, the longitudinal clefts by which the anthers open, and the 2-pluriovulate loculi of the ovary. *Windsorina* has strikingly similar anthers, capsules and seeds, and centrally attached solitary ovules (a character not mentioned by Gleason), which perhaps indicate the closest affinity, but this genus differs in the whole structure and facies of the inflorescence which was admirably described by its author (see Bull. Torr. Cl. **50**, 147–152 (1923)). The four involucre bracts of *Potarophytum* are to be compared only with those of *Rapatea viscosa* Gleason, from the Kurupung Mountains on the edge of the Pacaraima Range, a very distinct-looking plant with sessile flowers of which the stamens and ovary are undescribed and which is perhaps to be excluded from *Rapatea*; and with the three erect bracts of the new genus *Amphiphyllum* Gleason, from Mount Duida, which has only about ten flowers in the heads, about 20 bracts on each flower, acute or shortly acuminate petals, and two ovules in each loculus.

***Windsorina guianensis* Gleason.**

Potaro River: Amatuk portage; in damp spots in rocky forest by the portage, Sept. 12th 1937, *Sandwith* 1516. Flowering stems and heads pale yellowish-white. Petals pale yellow.

Discovered by Dr. O. W. Richards, leader of the expedition. Previously unrepresented in British herbaria, and now recorded for the second time in a new locality.

***Stegolepis angustata* Gleason.**

Kaieteur Savannah, in open sandy ground by the Indian trail, sometimes associated with *Brocchinia reducta*, Sept. 4th 1937, *Sandwith* 1349. Bracts pale yellowish-brown. Petals large, brilliant golden-yellow.

Material of this fine species, known only from this locality, is now distributed to several herbaria.

***Rapatea xiphoides* Sandwith, sp. nov.; *R. lineari* Gleason et *R. Wettsteinii* Suesseng. ex descriptione tantum cognitis affinis, ab illa praecipue bracteis involucri haud reflexis, forma bractearum floralium fere aequalium apice erectarum, sepalis minoribus, stylo brevior, ab hac receptaculo elongato, bracteis florum fere aequalibus acumine pungente omnium circiter 2 mm. longo statim distinguitur; *R. Spruceana* Koern. laminis foliorum apice obtusis, capitibus parvis**



Fig. 2. *Rapatea xiphoides* Sandwith. 1, base of plant, leaves and inflorescence, $\frac{1}{2}$ nat. size; 2, a flower with pedicel and basal bract, $\times 2$; 3, bract at base of pedicel, $\times 2$; 4, floral bract, $\times 4$; 5, calyx, $\times 2$; 6, petals and stamens, $\times 1.5$; 7, an anther, from front, $\times 4$; 8, an anther, from $\frac{3}{4}$ front, $\times 4$; 9, gynoecium, $\times 4$; 10, longitudinal section of ovary, $\times 8$; 11, transverse section of ovary, $\times 8$; 12, capsule after dehiscence, $\times 8$; 13, seed, $\times 4$.

quam bracteis involucris parvis usque duplo tantum brevioribus primo visu abhorret.

Herba terrestris, acaulescens, circiter 80 cm. alta, rhizomate 2 cm. diametro fibris numerosis longissimis pallidis praedito. *Folia* numerosa, 37–80 cm. longa, interpositis nonnullis multo brevioribus, siccitate laete flavo-viridia; vaginae 9–12 cm. longae, 1.2–1.9 cm. latae, margine brunneo-hyalino, in petiolum plus minusve distinctum supra convexum 4–8 cm. longum 3.5–6 mm. latum in laminam sensim transeuntem constrictae vel attenuatae; laminae ipsae lineares, 1.3–2.7 cm. latae, glabrae, integrae, longe sensim in apicem acutum attenuatae et per 3–4 cm. ultima angustissimae fere filiformes, costa utrinque prominente sed supra per trientem superiorem evanescente, nervis longitudinalibus utroque costae latere 7–9 praesertim subtus prominulis, venulis transversis haud obviis. *Pedunculus* usque circiter 42 cm. longus, apice sub capite ad 7 mm. diametro. *Involucris* bractaeae 2, anguste lanceolatae, eximie stricte erectae ac arcte parallelae gladiiformes, apice longe sensim attenuatae, basi cordatae vel rotundatae vel etiam in pedunculum decurrentes, haud connatae sed apici pedunculi (vel receptaculo) per circiter 2.3 cm. adnatae, aequilatae sed inaequilongae, altera quam altera circiter 3 cm. brevior, 15–23 cm. longae, basi 2–3 cm. latae. *Caput* ambitu ovoideo-sphaericum, lateribus contra bracteas involucris applanatis, 3.5–4 cm. longum, 3 cm. diametro, receptaculo elongato-oblongo ad 1.8 cm. longo et ad 9 mm. diametro. *Flores* valde numerosi, densissime congesti; bractaeae basi pedicellorum hyalinae, oblongae, 1 cm. longae, fere 3 mm. latae, in apicem pungentem circiter 1.2 mm. longum attenuatae; pedicelli circiter 2.5 mm. longi; bractaeae floris singuli 12–13, fere aequales, anguste spatulato-oblongae, ad basin distincte angustatae, apice incluso 9–10 mm. longae, 1.75–2.5 mm. latae, apice in acumen subulatum rigidum pungens 2 mm. longum abrupte contractae, arcte imbricantes apicibus erectis, aqua tinctae dorso pilis fragilibus obiectae, siccitate parte superiore pilis papillois apice brunneis indutae. *Sepala* tubo circiter 6 mm. longo coalita, tum ovata vel ovato-lanceolata, 6 mm. longa, 2.2–3.2 mm. lata, hyalina, trinervia, in apicem incrassatum pungentem valde acutum angustata, dorso dimidio superiore siccitate brunneo-papillosa. *Petala* tubo 5–6 mm. longo apice piloso coalita; lamina patula, flava, late obovata, plus minusve truncata ac in medio apice triangulari-acute, ungue incluso ad 12 mm. longa, 9–10 mm. lata. *Stamina* 6.5–7.5 mm. longa, filamentis liberis circiter 2 mm. longis aqua tinctis fragilissime albo-villosis; antherae lineari-oblongae, siccitate cremeo-albae, 3.5 mm. longae, tum appendice castanea 1.2 mm. longa terminatae. *Ovarium* obovoideo-oblongum, plus minusve trigonum, apice rotundato-truncatum, 2–2.5 mm. longum, 1.75 mm. diametro; stylus glaber, 8–9 mm. longus, inferne albo-hyalinus, apice stigmatifero aurantiacus. *Capsula* ellipsoidea, apice triquetra rotundata haud lobata, 4.5 mm. longa,

2.5 mm. diametro. *Semina* obovoideo-oblonga, 3.2 mm. longa, 1.75 mm. diametro, ventraliter subapplanata, dorso rotundata, apice basique lutea, ceterum olivacea longitudinaliter striatula, appendice apicali obtusa lutea vix 0.3 mm. longa instructa.

BRITISH GUIANA. Potaro River; Kaieteur Falls, in a running rivulet descending over rocky bushy ground from the savannah to the Falls, September 4th 1937, *Sandwith* 1337. Heads green, turning brown when old. Involucral bracts turning yellowish with age. Petals yellow.

TRIURIDACEAE.

Sciaphila albescens Bth.

Bartica-Potaro road, 14th milepost, plentiful on floor of greenheart and wallaba forest near the Barabara Creek, August 16th 1937, *Sandwith* 1095: stem pinkish-purple; flowers white.

The material differs from the description given by Giesen in Engl. Pflanzenreich, 4, 18, p. 67 (1938) in the uniformly tetramerous male and female flowers, the two stamens, and the densely papillose apex of the carpels. Examination of Bentham's description, however, shows that he discovered a tetramerous male flower with two stamens on the type material, and he has drawn this on the type sheet of *Spruce* 2833 at Kew. Moreover, some of the carpels of the type (on an individual flower with 6 perianth segments) are clearly papillose at the apex. It is evident that *S. albescens* varies in the degree of papillosity of the carpels and styles, as well as in the number of perianth segments. The papillosity of the styles of *Sandwith* 1095 is much weaker and less evident than in the type and in another collection from British Guiana, viz. *Myers* 3112 from near Mazaruni Head, Pacaraima Range, 1932; the latter collection bears 5-6 perianth segments, and smooth carpels. On present evidence *Sandwith* 1095 cannot be separated as a new species.

III—NICOTIANA LANGSDORFFII. H. S. MARSHALL.

The name *Nicotiana Langsdorffii* was published independently by Roemer and Schultes, by Nees von Esenbeck, and by Schrank. Roemer and Schultes published a diagnosis in their *Systema Vegetabilium* 4, 323, attributing the name *Nicotiana Langsdorffii*, and apparently also the description, to Weinmann.* The probability that Weinmann supplied this botanical description is enhanced by the fact that Schultes, after Roemer's death on January 15th, 1819, wrote to numerous botanists soliciting their help in the continuation of the *Systema Vegetabilium* and among those who promised to be responsible for various parts of it was "Weinmann Hortul. Pawlowsk" (*Syst. Veg.* 5, pp. v-vi: 1819). On the other hand, if Weinmann wrote the description, it is surprising that he should not have appended his name as author

* J. A. Weinmann, head gardener of the Imperial Garden at Pavlovsk, 20 miles south of St. Petersburg. *Vide* *Flora*, 1820, 2: 668-670; *Bot. Zeit.*, 17, 20 (1859).

when he included this species in his *Elenchus* (1824), p. 90. There he included it as *Nicotiana Langsdorffii* Hort. Pawl. This may, however, have been due to modesty on his part. Vol. 4 of the *Syst. Veg.* appeared before May 7th 1820, since it is reviewed in *Flora*, 1820, 1, No. 17, 257, of that date. The date, "1819," given on the title-page of Vol. 4, must be accepted unless it can be proved to be erroneous.—See *Internat. Rules*, ed. 3, Art. 45.

No evidence has been found that Weinmann sent specimens of *Nicotiana Langsdorffii* to Schultes. The latter placed *Nicotiana Langsdorffii* among the species dubiae, which suggests that Weinmann had sent him merely the diagnosis and description. The name should accordingly be cited as *Nicotiana Langsdorffii* J. A. Weinmann apud Roemer et Schultes, *Syst. Veg.* 4, 323 (1819). The species was probably grown in the Imperial Garden at Pavlovsk by Weinmann from seeds received from Langsdorff, who had collected them in Brazil.* The type of the name *Nicotiana Langsdorffii* J. A. Weinmann was presumably one of the plants so grown.

Nees von Esenbeck published the name *Nicotiana Langsdorffii* (spelt with one "f") with a description, in *Horae Physicae Berolinenses*, attributing it to "H[ortus] Berol." This work bears the date 1820, and a notice of the work appears in *Flora* 1820, 2, 477, where the date is also given as 1820. This description was apparently drawn up from a specimen from Herb. Otto and from a plant grown at Berlin.

The name *Nicotiana Langsdorffii* (also spelt with one "f") was published also by Schrank in his *Plantae Rariores Horti Academici Monacensis*, 2, fol. 72, t. 72. Schrank attributed the name to "D. F. Fischer in litt." The "D." presumably represents the word "Dominus," and the "Fischer" concerned was evidently Friedrich Ernst Ludwig von Fischer, who was then Superintendent of the Botanic Garden of Count Razoumoffsky at Gorenki near Moscow.† The figure, however, was prepared from a plant grown at the Munich Botanic Garden, and the description was evidently drawn up from this plant by Schrank himself. Fol. 72 of Schrank, *Pl. Rar. Hort. Acad. Monac.* 2, containing Schrank's description, appeared in Heft 7 of the work (see *Flora*, 1819, 2, 697, Nov. 28th, 1819, where it is stated that each Heft consists of 10 leaves with the same number of plates). W. T. Stearn, in his paper on this work (*Journ. Soc. Bibl. Nat. Hist.* 1, 151 : 1938), has shown that Heft 7 was published in Jan.–June 1821, and a notice of Heft 7 appeared in *Wikström, Jahresber. K. Schwed. Akad. Wiss. Bot. . . in den Jahren 1821, etc.*, 145 (1838), where the date of publication is also given as 1821.

It appears that seeds of the species concerned were rapidly distributed to several gardens under the name *Nicotiana Langsdorffii* (presumably without any authority appended), and that

* Vide Urban, *Vitae Itineraque Collectorum Botanicorum*, etc., in *Martius, Flora Brasiliensis*, 1, pars 1, 38 (1906).

† Vide Curtis's *Bot. Mag. Ded.* p. 39 (1931).

Weinmann, Schrank, and Nees based their respective descriptions on different material. The binary combinations *Nicotiana Langsdorffii* Weinmann apud Roemer et Schultes, *N. Langsdorffii* Hort. Berol. ex Nees, and *N. Langsdorffii* F. E. L. Fischer ex Schrank, are therefore not nomenclatural synonyms since they were based on different types. They have always, however, been treated as taxonomic synonyms.

The names *N. Langsdorffii* Hort. Berol. ex Nees and *Nicotiana Langsdorffii* Fisch. ex Schrank are accordingly later homonyms of *Nicotiana Langsdorffii* Weinm. apud Roemer et Schultes (Internat. Rules, ed. 3, Art. 61). The fact that the three species have always been treated as identical is immaterial in this connexion, being a matter of taxonomic opinion.

The name of the collector was spelt with one "f" by Pritzel* and in Cat. Libr. Brit. Mus. (Nat. Hist.) 3, 1057 (1910), with two by Wittstein† and Urban.‡ As the correct form of the name appears to be doubtful, the original spelling with "ff" is retained. The relevant synonymy of the species is as follows :—

Nicotiana Langsdorffii Weinm. apud Roem. et Schult., Syst. Veg. 4, 323 (1819).

N. Langsdorffii Hort. Berol. ex Nees, Horae Phys. Berol., 52 (1820).

N. Langsdorffii F. E. L. Fisch. ex Schrank, Pl. Rar. Hort. Acad. Monac. 2, 72 (1821).

This investigation was undertaken at the request of Prof. T. H. Goodspeed, who supplied some of the data.

IV—TWO NEW FERNS FROM OCEANIA.

CARL CHRISTENSEN.

Blechnum (Lomaria) phanerophlebium (Baker) C. Chr., sp. nov.

Lomaria phanerophlebia Baker in sched. Herb. Kew. *Lomaria adnata* Bl. sec. Baker in Journ. Linn. Soc. 17, 295 (1879), non Bl.

Rhizomate erecto vel decumbente, paleis castaneis vel fuscis crassiusculis lanceolato-acuminatis integris vestito, foliis fasciculatis. *Stipite folii sterilis* 15–20 cm. longo, stramineo, ut totum folium glaberrimo. *Lamina* late ovato-lanceolata, c. 25–30 cm. longa 15–20 cm. lata, papyracea, pinnata; pinnis c. 10-jugis, suboppositis, sursum alternis, 3–2 cm. inter se remotis, maximis 10–12 cm. longis 1–1.2 cm. latis (basalibus paulo brevioribus), acuminatis, integris vel marginibus subrepandulis, inferioribus sessilibus vel antice ad rhachin breviter adnatis, basin versus paulo angustatis, medialibus basi vix dilatata utrinque adnatis, supremis 3–4-jugis sat abrupte abbreviatis, confluentibus, apice pinnis medialibus persimili; venis distinctis, subtus subprominulis, simplicibus vel furcatis.

* Pritzel, Thes. Lit. Bot., ed. 2, 176 (1872).

† Wittstein, Etymol.-bot. Handwörterb., 498 (1856).

‡ Urban in Martius, Flora Brasiliensis, 1, pars 1, 38 (1840–1906).

Folio fertili magnitudine subaequali, pinnis 3 mm. latis 8-10 cm. longis, inferioribus petiolatis, indusiis atro-brunneis, crenatis.

FIJI. Viti Levu, sources of the Wai ni malu, 1877-78, *Horne* 939 (type) ; on rocky or stony steep slopes on a branch of the Navua River, Namosi, at 1000 feet, in wet places, *Horne* 812.

Baker did not describe this species because he later on identified the specimens with *L. adnata* Bl., which is *Plagiogyria adnata* (Bl.) Bedd. No species of *Plagiogyria* is known from Polynesia, and Copeland suggested therefore (Bishop Mus. Bull. 59: 58, 1929) that Baker's identification was wrong, which it is. The species is a genuine *Lomaria*, quite different from all Polynesian species known to me. The possibility remained that it might be *B. Milnei* (Carr.) C. Chr. a Fijian species very incompletely described by Carruthers, but his description fits badly the specimens at hand.

Later note: I have now seen the type-specimen of *Lomaria Milnei* Carr. in the British Museum (Natural History). It is a bad one, very different from *B. phanerophlebium* and in my opinion one of the many forms of *B. procerum* (Forst.) Sw.

Polypodium (Pleuridium) squamisorum C. Chr., sp. nov.

Rhizomate late repente, 3 mm. diam., glauco, paleis rufo-brunneis ovato-acuminatis integris subadpressis vestito. *Folii* dimorphis, coriaceis: *folii sterilis* petiolo 1 cm. longo, lamina lanceolata, 7 cm. longa, 2 cm. lata, basi rotundata, apice obtusa (?), marginibus incrassatis integerrimis, venis principalibus subtus elevatis, ceteris occultis. *Folii fertilis* petiolo 1.5 cm. longo, lamina 7 cm. longa, 1 cm. lata, basi cuneata et paulum decurrente, marginibus (in sicco) undulato-sinuatis; soris utrinque uniseriatis, magnis, superficiem inter nervum medianum et marginem implentibus, subimmersis, ovalibus (5×4 mm.) vel subrotundis, primum dense paleaceis, paleis e receptaculo ortis quam sporangia longioribus, rufo-brunneis, e basi tenui ovata in acumen longum leviter dentatum sat abrupte acuminatis, aetate deciduis.

PAPUA: Musgrave Range, 9200 feet, June 5th, 1889, *Sir. W. Macgregor* 15.

This remarkable species is a new addition to the many peculiar ferns found in later years in the high mountains of Papua. In general aspect it is not very different from several others with dimorphous fronds, but the paleaceous sori are very strange. In young sori the scales appear as a dense tuft overtopping and nearly hiding the sporangia. They are totally different from the clathrate, peltate scales found in the sori of *Lepisorus*.

V—ADDITIONS TO THE FLORA OF BORNEO AND OTHER MALAY ISLANDS. XI.* TWO UNRECORDED GENTIAN. H. N. RIDLEY.

Dr. C. A. Backer, of Heemstede, Holland, has recently sent to Kew material of an interesting small Gentian collected in Java by

* Continued from K.B. 1938, 285.

Dr. L. van der Pijl, with the request that it might be described if found to be a new species. Sumatran material collected by Mr. J. A. Lörzing was also forwarded for comparison.

The Javan specimen proves to be *G. cephalodes* Edgeworth, and Dr. Backer's description of the plant in English is appended.

The Sumatran specimens, however, represent an undescribed species, which has been named after its discoverer, Mr. J. A. Lörzing, at Dr. Backer's request. Mr. Lörzing is a keen and able botanist who, from 1915 until his retirement from public service in 1924, held the post of conservator of the botanical establishment (closed down in 1924) of Sibolangit, near Medan, N. Sumatra.

***Gentiana cephalodes* Edgeworth ex Thoms. et Bacon** in Hook. Lond. Journ. Bot. **4**, 637 (Dec. 1845); Edgew. in Trans. Linn. Soc. **20**, 84 (1846).

Stemless, glabrous. Leaves 4-8 in a radical rosette, broadly elliptic, acute or obtuse, 6-18 mm. long, 4-12 mm. wide. Flowers in 1-3 shortly stalked or subsessile 3-flowered cymes, 5-merous; pedicels very short; calyx 7-9 mm. long, divided less than halfway down; segments distant, very narrowly triangular, very acute, keeled; tube strongly ribbed, with 5 nerveless fields alternating with the calyx-segments. Corolla 10-12 mm. long, blue; corolla tubular, widened upwards; segments at the base united by inwardly folded shortly bifid *not* fimbriate membranes, acute, not caudate. Fruit borne on a thick stalk, exserted from the corolla, very narrowly bialate at the apex; seeds numerous, very small, $\frac{1}{4}$ - $\frac{1}{3}$ mm. long, reticulate, not winged.

JAVA. Slope of Gunung Tambak (Mount Idjèn), on ashy soil covered by tall grasses, June 1929, *Van der Pijl* 141 (Herb. Hort. Bogor.; dupl. in Herb. Kew).

This species is usually described as a variety of the much larger *G. capitata* Ham., but it is a dwarf plant only two or three inches in height. *G. cephalodes* Edgew., exactly agreeing with the Javanese plant, is found in the Himalayas, Mussoori, Chakrata, Simla, Naini Tal, Kumaon and Sikkim.

***Gentiana Loerzingii* Ridley**, sp. nov.; a *G. kumaonensi* Biswas, cui affinis, foliis marginibus minutissime denticulatis, sepalis angustioribus acutis, corollae lobis angustis acuminatis, stylo bifido lobis recurvis differt.

Herba minima, simplex, 1-1.5 cm. alta. *Folia* in apice congesta, carnosa, obovata, acuta, basi angustata, margine pallida, minutissime denticulata, 5-7 mm. longa, 3-4 mm. lata, nervis invisibilibus. *Flores* 5 vel 6 in apice congesti. *Pedicelli* 2 mm. longi, crassi. *Bractee* anguste lanceolatae, acuminatae, marginibus denticulatis. *Sepala* 5, lanceolata, acuminata, angusta, 4 mm. longa, denticulata. *Corolla* caerulea, tubo cylindrico 2 mm. longo, lobis 5 lanceolatis acuminatis acutis angustis 5 mm. longis basibus 1 mm. latis, plicis 5 minutis acutis triangularibus. *Stamina* 5, filamentis

gracilibus ad basin corollae tubi adnatis paullo dilatatis, antheris oblongis obtusis. *Ovarium* cylindricum, 2 mm. longum, stylo brevi crasso lobis crassis recurvis.

SUMATRA: Sibolangit. Raja (Karo-plateau), sunny grassy localities (deserted fields), amongst low grass, scattered, ± 1300 m., 24 Jan. 1920, *Lörzing* 7075 (typus; dupl. in Herb. Kew.); "Earlier (13.3.1917) a single specimen found in this region (No. 4092) [not seen]; several specimens now discovered in another similar locality on a surface of a few square meters. Flowers a fine blue, open during the hottest part of the day only." Between Mount Piso-piso and Lake Toba near Tongging, steep grassy slope, rare, ± 1200 m., 21 Nov. 1920, *Lörzing* 8103: "Tiny herb; only fruiting specimens found." Karo-plateau, near Brastagi, sunny locality, amongst short grass, many specimens in a limited area, ± 1300 m., 26 May 1921, *Lörzing* 8416: "Flowers blue." (Omnia in Herb. Hort. Bogor.)

This tiny inconspicuous species resembles *G. kumaonensis* Biswas, of Kumaon, India, especially in its fleshy leaves, which are, however, minutely denticulate on the cartilaginous edge and narrowed to the base, and in the narrow acuminate sepals and petals, and the bilobed style.

VI—MISCELLANEOUS NOTES.

New Year Honours.—We have much pleasure in recording the conferment of the following Honours:—

K.C.M.G.—SIR ALGERNON EDWARD ASPINALL, C.M.G., C.B.E., Secretary to the Imperial College of Tropical Agriculture, lately Secretary to the West India Committee; Knight Bachelor—REGINALD GEORGE STAPLEDON, Esq., C.B.E., M.A., Professor of Agricultural Botany, University College of Wales, and Director of the Welsh Plant Breeding Station, Aberystwyth; C.M.G.—JOHN NINIAN OLIPHANT, Esq., Director of the Imperial Forestry Institute, Oxford; C.I.E.—WILLIAM BURNS, Esq., D.Sc., Agricultural Expert to the Government of India in the Imperial Council of Agricultural Research Department.

Mr. Ernest Harrison.—Mr. E. Harrison, C.M.G., B.Sc., who has just retired from the Colonial Agricultural Service, has had an interesting career. Educated at Holmes Chapel (Cheshire), Edinburgh University and the State College of Agriculture at Ames, Iowa, U.S.A., he went out to South Africa in 1910, serving on the staff of the Grootfontein Agricultural College (Cape Province). In 1913 he became the Principal of the School of Agriculture at Cedara in Natal. He joined the Colonial Agricultural Service in 1921 and was Deputy Director of Agriculture in Kenya for nine years. He was then promoted to Tanganyika Territory as Director. He proved a successful administrator and raised the Department

in Tanganyika to a high state of efficiency. His outlook on agricultural matters was essentially wide, and his methods for dealing with such matters as closer settlement and soil erosion problems were on a definitely sound basis. He has now accepted the Chair in Agriculture at the Imperial College of Tropical Agriculture, Trinidad, which has fallen vacant on the retirement of Professor R. Cecil Wood, and his wide experience and previous knowledge of teaching should prove invaluable to him in his new post.

G. EVANS.

Dr. R. Lloyd Praeger.—We record with pleasure the conferment of the Honorary Degree of Doctor of Science by the University of Dublin (Trinity College) on Dr. R. Lloyd Praeger, D.Sc.

Mr. Morley Thomas Dawe.—Mr. M. T. Dawe, O.B.E., who retired from the Colonial Agricultural Service on 22nd November 1938, has had a very varied and interesting career. After the completion of his training at Kew, he was posted to Uganda in 1902 and became head of what was then known by the cumbersome title of the Botanical Forestry and Scientific Department. This was the ancestor of the present highly developed Department of Agriculture, and undoubtedly the work of Dawe and his colleagues did much to pave the way to these modern developments. He left the Colonial service for a period in 1910 and served in Mozambique as Director of Agriculture and in Colombia as Agricultural Adviser to the Government of that Republic, with headquarters at Bogota. When the war ended he was sent by the Colonial Office to report on the Gambia in 1919 and as a result of his visit an Agricultural Department was formed. He afterwards worked in Angola for three years in the employ of the Fomento Geral de Angola and was then appointed Commissioner of Lands and Forests in Sierra Leone. In 1928 he was made Director of Agriculture in Cyprus where he stayed until he was promoted to his last post of Director of Agriculture and Forests in Palestine.

Although in recent years he has devoted most of his time and attention to administrative matters, yet his interest in botanical matters has always been maintained, and throughout his career he has been on the look-out for new plants and species, particularly if they had possibilities of economic use. He has continued to keep in close touch with Kew, and past and present members of the Kew staff will all wish him long life and a pleasant time in retirement.

JOHN WILLIAM BEWS.—It is with deep regret that we record the death on November 10th of Dr. John William Bews, M.A., Principal and Professor of Botany of Natal University College, Maritzburg, Natal. He had been ill for some months.

Professor Bews was born at Kirkwall, in the Orkney Islands,

in 1884. From the local school he entered the University of Edinburgh as Earl of Zetland Bursar in 1902, and after graduating was appointed lecturer in economic botany at the University of Manchester. In 1908 he returned to Edinburgh as Lecturer in Plant Physiology and Assistant Professor of Botany under the late Sir Isaac Bailey Balfour.

In 1910 Bews was appointed Professor of Botany in Natal University College, and has held that post ever since except for a short period (1925–1927), when he occupied the chair of botany at Durham. In addition, since 1930, he has been Principal of the Natal College, and was responsible for organising the recent rapid developments in university work which have taken place in Natal, and which, it is hoped, will lay the foundations for a future University of Natal. He also worked hard to establish a faculty of Agriculture at the College.

Besides being a botanist of great repute, especially as an ecologist, Bews was a philosopher, and since 1935 he has published two books, "Human Ecology", and "Life as a Whole". In 1925 he produced a book on "Plant Forms", and soon afterwards "The Ecological Evolution of Angiosperms". In the sphere of taxonomic botany Bews was also well known. In 1921 he brought up to date J. Medley Wood's "Flora of Natal and Zululand" in a much improved form, and in 1929 he published a compendium on the "World's Grasses," this being largely a compilation from other works.

Not only did Bews write many other important papers, but he also built up a strong department of botany at the Natal University College. He was a very successful teacher and an able director of students' research. Several of his past pupils have achieved success and hold important posts in the botanical world.

In 1931 Bews was President of the South African Association for the Advancement of Science, and in 1932 the Association awarded him the South African Gold Medal in recognition of his distinguished services in the science of botany.

J. HUTCHINSON.

HENRY ALFRED CUMMINS.—We record with regret the death of Emeritus Professor Major H. A. Cummins, R.A.M.C., C.M.G., M.D., on January 1st, 1939, in his 74th year.

He was a native of Cork and after graduating at the Royal University of Ireland he served in the Sikkim Expedition, the Ashanti Expedition—on which he published an account of the Botany (K.B. 1898, 65)—in Bermuda, where he collected some Fungi (K.B. 1898, 133), and in the South African War, when he was mentioned in despatches, was awarded the C.M.G., and was appointed by Lord Roberts a member of his staff.

On his retirement from the army he joined the Kew staff and acted as Assistant for India during the absence of Mr. J. F. Duthie

in 1906 and was subsequently (1909) elected Professor of Botany at University College, Cork. On his retirement from the Chair at Cork he was granted the title of Emeritus Professor and then resided at Chelsea, where he died. He was elected a Fellow of the Linnean Society in 1893.

Choice between Epithets of the Same Date.—The genus *Monospora* Hochst. (Flora, 24, 660 : 1841) included two species, *M. rotundifolia* Hochst. and *M. grandifolia* Hochst., descriptions of which were published on page 661. The description of the former species is a good one, but that of *M. grandifolia* is poor, being merely a comparison of that species with *M. rotundifolia*, of which Hochstetter thought it might prove to be a variety. It is clear, therefore, that *M. rotundifolia* is the type of the generic name *Monospora* Hochst.

In 1893 Warburg (Engl. & Prantl, Pflanzenfam. 3, 6A, 37) transferred *M. grandifolia* to the genus *Trimeria* Harv., as *T. grandifolia* (Hochst.) Warb. He gave illustrations of the plant and made no reference to *M. rotundifolia*. In 1921, Gilg (Engl. Pflanzenw. Afr. 3, 2, 582) transferred *M. rotundifolia* to *Trimeria* Harv., as *T. rotundifolia* (Hochst.) Gilg, citing exactly the same illustrations as those used by Warburg for *T. grandifolia*, so that although he did not explicitly cite *M. grandifolia* as a synonym there can be no doubt that he considered the two species conspecific and deliberately adopted the epithet *rotundifolia* in place of *grandifolia*.

Gilg appears to be the first botanist to treat these two names as synonymous, and, according to Article 56 of the International Rules of Botanical Nomenclature, the epithet chosen by him, namely *rotundifolia*, must be adopted for the species.

It might conceivably be argued that *T. rotundifolia* (Hochst.) Gilg was superfluous when published and therefore illegitimate under Article 60, there already being a valid name, *T. grandifolia* (Hochst.) Warb., for the group to which it was applied. The wording of Article 60 (1), as amended at Amsterdam in 1935, is as follows: "A name is illegitimate . . . if it was nomenclaturally superfluous when published, i.e. if the group to which it was applied, as circumscribed by its author, included the type of a name which the author ought to have adopted under one or more of the Rules." But Gilg was under no obligation to adopt the name *T. grandifolia*, which was consequently not valid (i.e. correct) for the aggregate species although it was a legitimate name. When an author treats as synonymous two specific names published at the same time, he has the right to choose whichever epithet he wishes for the aggregate species, and, in this case, Gilg wisely chose the epithet belonging to the type-species of *Monospora*, namely *rotundifolia*. *Trimeria rotundifolia* (Hochst.) Gilg is accordingly the correct name for the aggregate species. The fact that the combination *Trimeria*

grandifolia (Hochs.) Warb. had already been published did not make the combination *T. rotundifolia* nomenclaturally superfluous under Art. 60, as amended.

E. MILNE-REDHEAD.

Preservation of the Flora of St. Helena.—We note with interest that His Excellency the Governor-in-Council has issued an order [Forest Reserve (Indigenous Flora) Order 1938] whereby the following lands are constituted as Forest Reserve :—

1. The lands within 300 feet of the summit of the Central Ridge between Diana's Peak, Mount Actaeon, and Cuckholds Point.

2. The lands within 150 feet of the summit of High Peak.

3. The lands within 200 feet of the summit of Old Joan Point situated on Man and Horse.

This order should be of great value in preserving the vegetation on the higher slopes of the Island's mountains where some of the interesting indigenous plants may still be found.

Ocotea viridis.—The name of a Kenya tree, *Ocotea Gardneri* Hutch. et M. B. Moss in Kew Bull. 1930, 70 cum ic., has been changed to *Ocotea viridis* Kosterm. in Bull. Jard. Bot. Brux. 15, 83 (1938), because it is antedated by *Ocotea Gardneri* (Meissn.) Mez in Jahrb. Bot. Gart. Berlin, 5, 338 (1889), the name of a Brazilian tree.

Botanical Magazine.—Part 3 of Volume 161 was published on November 28th and contains the following plant portraits :—

Tulipa Schmidtii Fomin (t.9535), a distinct species from Talysch in Trans-caucasia ; *Vaccinium glauco-album* Hook. f. ex C. B. Clarke (t.9536), a purple-fruited species, discovered as long ago as 1838 by Griffith in Bhutan ; *Viola allchariensis* G. Beck var. *Herzogii* W. Becker (t.9537), an interesting *Viola* with linear leaves from North Macedonia ; *Rhododendron cerasinum* Tagg (t.9538), a species which shows considerable variation in the colour of the flowers from uniform crimson to a pale-pink tube with pinkish-crimson lobes, native of North Burma, Assam and Tibet ; *Coelogyne speciosa* (Bl.) Lindl. var. *alba* Hort. (t.9539), a variety known only from cultivated specimens, but probably native in western Malaya ; *Ceanothus foliosus* Parry (t.9540) a native of California ; *Fritillaria liliacea* Lindl. (t.9541), a species with greenish-white flowers found in western North America ; *Columnnea hirta* Klotzsch et Hanst. ex Hanst. (t.9542), a handsome species from Central America extending from Nicaragua to Panama ; *Picea Breweriana* S. Wats. (t. 9543), a weeping Spruce found only in a few localities about Mt. Shasta, on the borders of Oregon and California ; *Moraea Carsoni* Baker (t.9544), from Tropical Africa, and *Jasminum polyanthum* Franchet (t.9545), a beautiful pinkish-white-flowered Jasmine with the

tube of the corolla crimson on the outside, a native of Yunnan, Kweichow, and the southern part of Szechwan—a species hardy in the south-west of England and very beautiful in gardens on the Riviera.

Ornamental Flowering Trees and Shrubs.*—The Royal Horticultural Society cannot be accused of being premature in holding its first Conference on Ornamental Flowering Trees and Shrubs in April last. Within the last fifty years two conferences have been held on conifers, a much less important group from the gardener's point of view, especially at the present time. It also reflects one of the changes in public taste, for with the exception perhaps of Alpine and Rock Garden plants—to which, indeed, shrubs contribute no unimportant a section—no branch of horticulture is more popular in these days.

As was pointed out during the conference, this is largely due to the enormous additions made to cultivated trees and shrubs during the present century by plant collectors like Wilson, Forrest, Kingdon Ward and Comber. They have not only added many species to old and well known genera, but have brought many quite new types into cultivation. It has also been influenced by the fact that once the initial outlay in the preparation of the ground and obtaining the plants has been met, no branch of ornamental gardening, considering the returns we get in beauty of leaf, flower, fruit and autumn colour, is less costly.

The programme planned by the Committee was on the whole a comprehensive one, but a great many beautiful trees and shrubs got little or no notice. It would have been a useful thing, after allotting the great groups, if some one had been deputed to deal with the "left overs" and oddments, many of which play a very important part in gardens. It is true that Mr. Besant of Glasnevin gave a paper on "Other flowering Trees and Shrubs," but he confined his notes to some nine or ten genera. The consequence is (judging by the excellent index) that an outstanding genus like *Erica* gets scant notice, the lovely *Enkianthus* none at all; nor do *Stewartia*, *Styrax*, *Ribes*, *Yucca*, *Robinia*, *Catalpa*, *Amelanchier*, *Sophora* and others, get more than barest mention if any at all.

At the opening meeting on April 26th, after the ordinary preliminaries had been disposed of, Dr. F. Stoker gave a very charming paper under the comprehensive title of "The use of flowering Trees and Shrubs." That part of it dealing with shrubs for rock gardens is especially interesting and valuable. No one has a greater knowledge of these plants than the author. He has published a little book on the subject and grows an astonishing

* Report on the Conference held by the Royal Horticultural Society, April 26-29, 1938, edited by F. J. Chittenden, F.L.S., V.M.H. London, R.H.S. Offices, Vincent Square, S.W.1. Pp. 271, 80 plates. Price, to Fellows 7s. 6d., to others 10s. 6d.

number of rare species in his own rock garden. In the discussion that followed, the question of the identity of *Mahonia nervosa* and *M. repens* was raised. They are perfectly distinct, and the former has twice as many leaflets to a leaf as the latter. The plant figured on Plate 4 as *M. repens* is almost certainly *M. nervosa*.

It was fortunate that the help of Mr. Collingwood Ingram could be obtained to deal with cherries and crabs. Of the cherries he has a more comprehensive acquaintance than any one else in this country, and as regards those commonly grouped as "Japanese" he is our leading authority. He not only grows a collection of them in his garden at Benenden, more nearly complete than any other in the British Isles, but he has studied them *in situ* in Japan.

The conference was fortunate also in having represented there four of the most famous gardens in Britain, namely Nymans, Exbury, Bodnant and Highdown. Mr. Comber, the talented gardener at Nymans, contributed a useful paper on "The Broom and Cistus Families." This could only have been a pleasant and comparatively easy task for him. Very different was the work undertaken by Mr. Lionel de Rothschild, who had Berberis, Cotoneaster and Viburnum allotted to him, three of the most difficult genera amongst shrubs. The magnitude of the collections at Exbury no doubt contributed to the very successful results embodied in this essay. They also enabled the author to give lists of the best kinds in each genus, which is extremely useful information for a beginner to have available.

Lord Aberconway contributed papers on Magnolia and Camellia, two of the pleasantest genera with which a gardener can have to deal. It owes its excellence very much to the fact that the author has evidently a close personal acquaintance with his subjects. In the magnolia section it is gratifying to note that he considers *M. Campbellii* and *M. mollicomata* "markedly different." One difference is particularly valuable: the latter flowered at Bodnant in twelve years from seed, whereas seedlings of *M. Campbellii*, as is well known, will take twice or thrice as long.

Major Stern's paper was on "Trees and Shrubs for various climates and soils." His garden at Highdown is situated on the seaward slope of the South Downs and is unmitigatedly chalky. A considerable part of it, in fact, is on the site of a disused chalk pit. Major Stern is an enthusiastic experimenter and has tried practically every tree and shrub worth trying. We have, in consequence, come to regard him as our highest authority on the matter of lime-loving and lime-hating subjects. To those whose gardens are on calcareous soil this paper may be recommended as one of the highest value.

Two papers were given on purely practical, as apart from the ornamental aspects of gardening, one on pruning by Mr. W. Dallimore, the other on propagation by Mr. F. P. Knight. Both authors are alumni of Kew and to the experience gained there may be largely attributed not only the excellence but the comprehensive quality of

their essays. A discourse by Mr. R. M. Wallace on arrangement is likely to be valuable to many beginners in giving a comprehensive enumeration of, and comment on, the very cream of flowering trees and shrubs.

In conclusion may be mentioned papers on "The Lilac in Canada" by Mesdames Davis and Preston; on "Syringa, Philadelphia, Deutzia, Diervilla, Escallonia and Hibiscus" by Mr. H. G. Hillier; and one on "Sorbus, Cydonia and Crataegus" by Mr. W. J. Bean. They will all, no doubt, prove useful for purposes of reference.

Australian Essential Oil Plants.—During the last ten or twelve years a good deal of investigation has been carried out on essential oil plants in Australia (chiefly species of *Eucalyptus*), by Mr. A. R. Penfold of the Technological Museum, Sydney, and his collaborators. Although this work has been primarily of a chemical nature, interesting facts from a botanical point of view have been brought to light.*

One of the first species to receive close attention was *Eucalyptus dives* Schauer, the common "Broad Leaf Peppermint," which has long been of economic value for its essential oil, an oil normally high in piperitone (usually 45–50%) and important as a commercial product. This species is widely distributed, and in most areas where it occurs the high piperitone content of the oil is fairly constant, but trees have been found in certain districts which persistently yield oil with only 5% to 15% of this constituent, while other components are present which seriously affect the market value of the oil. When the leaves of such trees happen to have been commercially distilled in the past the inferior nature of the oil has sometimes led to heated disputes between buyer and seller and to accusations of adulteration.

A closer study of the species and its distribution showed that some trees existed with a piperitone content intermediate between the figures shown above. Morphologically there was no difference at all between these forms and the normal one, both experienced botanists and bushmen failing to distinguish them. It was found, however, that the desirable form (with high piperitone), could be differentiated from the others in the field, by those experienced in the various odours of *Eucalyptus* oil constituents, by simply crushing the leaves in the hand.

Seedlings were raised from seed of the normal and the three physiological forms of *Eucalyptus dives*. In each case they developed true to type. The young seedlings were morphologically identical, yet "when tiny fragments of the leaves, even from plants only $1\frac{1}{2}$ inches in height, were rubbed between the fingers, the characteristic odour of each particular kind was readily detected. The

* Published from time to time in the Journal and Proceedings of the Royal Society of New South Wales.

seedlings could be mixed, and yet readily sorted out again by means of the test described." About five years later when these seedlings had matured they still showed no morphological differences and the constituents of their oil agreed closely with those of the original parent trees.

The discovery of the existence of these inferior physiological forms of *E. dives*, and the fact that they are recognisable in the field by those with the necessary skill or experience, proved to be of value to the oil industry itself in that certain proposed new areas could be assessed before distillation commenced.

Since the above work on *Eucalyptus dives* was carried out, the existence of similar physiological forms in other oil-yielding species of *Eucalyptus* in Australia (e.g., *E. australiana* Baker & Smith, *E. haemastroma* Sm., *E. micrantha* DC., *E. piperita* Sm. and *E. radiata* Sieb.), has been demonstrated by the same investigators and it is thought that yet further species, so far uninvestigated, will in time be found to vary in the same manner.

Eucalyptus radiata Sieb., commonly known as "River White Gum," generally yields an oil of remarkably uniform composition with a high proportion of phellandine and not more than 5% piperitone. Investigation in certain areas, however, established the presence of a form of *E. radiata* with as much as 50% piperitone and of another with 20% to 30%. The first mentioned of these "would be of considerable economic importance if a stand or area of the trees, comparatively free of the type, could be located." Seed of the normal form or type of *E. radiata* and the form with high piperitone content (50%) were sown, and the oil from the young trees obtained was examined some years later. In this connexion it is now stated "The results obtained confirm the constancy of the several forms or varieties, but a remarkable observation was made with a tree planted from seed of the form called Variety A. In this particular instance two stems grew from the one root system. The leaves and terminal branchlets from each stem were separately distilled, when the essential oils were found to differ from one another in chemical composition. One yielded an oil containing 50% piperitone, identical with Variety A, and the other yielded an oil containing only 18% piperitone with a considerable quantity of piperitol and, consequently, it bore a very close resemblance to what we prefer to regard as the type." F. N. HOWES.

The World was my Garden.*—This book is the autobiography of David Fairchild, one of the foremost American agricultural botanists. He was in charge of the Division of Foreign Plant Exploration and Introduction of the U.S. Department of Agriculture for over twenty years, and retired in 1935.

* "The World was my Garden." Travels of a Plant Explorer, by David Fairchild, assisted by Elizabeth and Alfred Kay. Charles Scribner's Sons, Ltd., 23, Bedford Square, London, W.C.1. Pp. xiv + 494, many illustrations. Price 18s.

During the course of his career, Fairchild travelled most extensively and visited practically every country under the sun. His experiences have been many and varied and an account of them is given in this volume. So extensive were his journeyings that it is somewhat difficult to grasp salient facts, so quickly does the scene change, and one hopes that the opportunity will arise for another volume to be published in which a more detailed account of some of the more important of his introductions will be set forth. As it is, limitations of space have obviously made it impossible to do more than make passing references to introductions of great economic value.

The book is obviously written for the layman, and the magnificent photographs—mostly taken by the author himself—that illustrate the volume add greatly to its attractiveness.

Fairchild worked in the golden age of the plant-explorer. In the latter part of last century large areas were still practically unknown botanically and agriculturally, and he was one of the pioneers in the introduction or exchange of new and valuable species of plants from one country to another. One reads of a vast series of economic plants and varieties such as Tung Oil (*Aleurites* spp.) from China, Avocados from the Argentine, Egyptian Cotton, Red Gemesh Hops from Germany, Dates from Iraq, Bamboos, and many others. These have all been introduced into the United States, and are now being grown there in their original state over considerable areas, or have been used in plant-breeding to the great economic benefit of the country.

The book is written in a friendly, conversational style and is enlightened throughout with accounts of personal experiences combined with a sense of humour. The account of the American expedition that set out to take possession of an "Adamless" Island in the South Pacific, inhabited only by most beautiful native women, is an example. As is perhaps natural in a treatise covering such extensive ground, slight inaccuracies seem to have crept in here and there, as for example, the account of the first discovery of seedling canes in Barbados in 1898. It must be remembered, however, that most of the volume was recorded from memory, as we are reminded in the preface by the collaborators, Mr. and Mrs. Kay.

The book is a long one and is so full of events that it cannot be read hurriedly, but it should prove a valuable record of the date and origin of many valuable plant introductions. G. EVANS.

The Vegetation of Albany and Bathurst, South Africa.*—The area dealt with by Dr. Dyer is a portion of South Africa where at least three quite distinctive floras meet. It contains small patches of (1) the real Cape or South Western flora, (2) a considerable

* The Vegetation of the Divisions of Albany and Bathurst, by R. A. Dyer, D.Sc. (South Africa), pp. 138, with 4 maps, 4 diagrams and 42 photographs (Botanical Survey of South Africa, Memoir No. 17).

quantity of the Karoo flora of the Addo Bush type, and (3) the Subtropical or Natal flora, the last mentioned being the most extensive.

The foundation of Dyer's work was laid during his period of service from 1925 to 1930, when as Government Botanist he had charge of the excellent herbarium at Grahamstown. This was followed by some years' intensive taxonomic study of the flora in the Kew herbarium, an ideal procedure which if followed by other students of vegetation would bring about a vast improvement in their results.

The paper begins with an interesting history of early botanical exploration in the area, which was visited in turn by such famous travellers as Sparrman, Paterson, and Burchell, and more purely botanical collectors such as Ecklon, Zeyher, and Drège.

Following this are notes on the history and development of the Albany Museum herbarium, which contains a fine set of Ecklon and Zeyher's duplicates.

Chapter 2, on the topography and geology, is contributed by Professor E. D. Mountain, of Rhodes University College, and includes two maps; and chapter 3, dealing with climatic and some biotic factors, carries the reader as far as p. 55, leaving only some twenty odd pages for the account of the vegetation.

This is described under several headings such as, (1) Lagoon, (2) Vlei, Marsh and Stream, (3) Strand, (4) Coastal Lithosere, (5) Psammophilous Macchia and Littoral Scrub.

Chapter 5 is devoted to Fynbos, the survivors of the southwestern flora, which we learn are decreasing rapidly owing to present-day methods of stocking and veld management. Other sections of the paper deal with Karoid Scrub and Grassland, a bibliography mainly of works on ecology, and at the end there are a number of interesting photographs.

It seems a pity that the author has arranged the families of Dicotyledons alphabetically and not systematically, for to a taxonomist it is a trifle disconcerting to encounter first of all the family *Anacardiaceae*, succeeded by *Araliaceae* and then *Asclepiadaceae*, etc. In the reviewer's opinion this detracts somewhat from the high scientific standard of this valuable contribution to our knowledge of South African vegetation.

J. HUTCHINSON.

St. Helena Lilies.—The history of these beautiful lilies, which have been the subject of admiration to so many visitors to the Royal Botanic Gardens, Kew, during the last few months, has been outlined by Toms in the Royal Horticultural Society's Lily Year Book, 1937, p. 110, and a summary of the facts may be of interest to readers of the Bulletin. So long as St. Helena was a naval station and an important coaling centre, agriculture, which is the only industry, was more or less prosperous, as the farmers had a ready market for their produce. With the abandonment of the

naval station and the decline in the number of ships calling at the port, due to a large extent to the substitution of oil fuels for coal, the agricultural industry rapidly declined as the home market for produce became negligible. The problem was to try and introduce some crop which could bear the long distance of transport to the commercial markets of the world and which would also bring in returns commensurate with the costs of production and marketing. The post-war period was a particularly difficult time for the St. Helena farmer as most of the agricultural products that the Island is capable of producing were already being produced in abundance in other countries which possessed special advantages, especially in such matters as cheaper freight rates and better transport facilities.

In August 1929 the Governor of St. Helena pointed out the difficulties of the situation in a despatch to the Secretary of State for the Colonies, which covered a report by the Curator of the Gardens, who at that time was Mr. Bruins-Lich. The agricultural situation of the Island was fully discussed and certain suggestions made for the bettering of the agricultural and horticultural conditions. One of these was the possibility of growing lilies. A parallel to Bermuda was drawn and it was pointed out that the growing of lilies (*L. longiflorum*) for the New York market had become an important industry in that Island.

The Governor's despatch was forwarded by the Secretary of State to the Director of Kew for favour of consideration and the latter in his reply made the suggestion that the cultivation of bulbs of both the Bermuda Lily (*L. longiflorum*) and the Madonna Lily (*L. candidum*) for export to the United Kingdom should be given a thorough trial. Following up this suggestion, Mr. Bruins-Lich collected about 4000 bulbs of *L. longiflorum* from various small-holders and planted them on the Scotland Estate which the Government of St. Helena had purchased as an agricultural and horticultural experimental station. These bulbs had presumably been introduced as garden plants on various occasions over a period of years.

The result of these experiments was to prove definitely that the lilies flourished under St. Helena conditions, and in the spring of 1935 a consignment of bulbs was brought to Kew where they were planted, some in pots in a cold house, and some in the open, and blossomed from September to December, the display attracting considerable attention. The Director was thus in a position to recommend that an attempt should be made to establish an export trade in lily bulbs from St. Helena to the United Kingdom.

Further consignments of bulbs arrived in the following year and were equally successful, an exhibit of St. Helena lilies being sent to the Autumn Show of the Royal Horticultural Society, where it attracted much favourable attention.

The attention of the Colonial Office was drawn to the success of these trials by the Director, who urged that every effort should be made to establish the industry in St. Helena on a firm basis.

It was pointed out that the St. Helena bulbs came into flower in England in the autumn at a time when it is difficult to find this lily in blossom unless the bulbs have been retarded or specially treated ; the St. Helena lilies, therefore, fill a very definite gap.

The fact was also emphasized that there was a strong demand for lily bulbs in this country and that the monopoly was largely held by Japan. The decision to develop the industry was taken and in 1936 the first commercial consignment of 2000 bulbs was sent to England. Since then the demand has increased and a display of lilies grown at Kew was staged in the St. Helena section of the Colonial Hall at the Empire Exhibition at Glasgow in 1938. This led to a number of enquiries from the general public and from commercial seedsmen and florists, and two prominent Glasgow firms have decided to stock the bulbs. This industry, if carefully fostered, should help the growers in St. Helena to more prosperous times.

It may be mentioned here that in 1931 seed of 21 different kinds of lilies were sent from Kew to St. Helena, and, later, some bulbs of Roman Hyacinths, in the hope that they might be successfully grown in the Island.

The Characteristic Vegetation of recent Volcanic Islands in the Pacific.—During the autumn of 1925 the writer had the opportunity of landing at several islands of volcanic origin in the Vitiaz Straits. These Straits separate the large island of New Britain from the mainland of New Guinea and consist of a wide waste of water studded with reefs and islands. On one island called Aröp (or Long) Island a stay of over three days was made as the weather was very stormy at the time and our tiny craft had to run in for shelter and anchor as close to the beach as possible in order to gain protection. Aröp is in many ways typical of the islands in this archipelago and is situated at about 5°S. lat. and 147°E. longitude. It is about thirteen or fourteen miles long and three or four miles across at the broadest point. In the middle is a peak of perhaps 1000 feet in height. The formation is entirely volcanic and consists of lava boulders on the slopes of the mountain whilst the peniplane is composed of a loose porous ash soil. The beach sand is pitch black in colour and provides a violent contrast to the dazzling white strands found on the coral reefs that so commonly occur in other parts of this region. The vegetation is quite peculiar and ecologically most interesting. Although the rainfall is probably at least 70 inches per annum, judging by the fact that these islands lie in a wet belt, yet owing to the porous nature of the soil, combined probably with the desiccating effect of the constant trade winds,

there is very little undergrowth and a marked absence of epiphytes, tree ferns and similar undergrowth. The low plain at the north-east end of the island was covered with a growth of trees all approximately of the same age and probably between thirty or forty years old. There was so little undergrowth that one could walk about quite freely between the trees, whereas, of course, in tropical forests in similar latitudes it is usually necessary to hack one's way through with a cutlass.

There was a marked absence of coconuts and possibly the volcanic ash soils, which are apparently very acid, do not suit this species. The commonest forest tree was *Barringtonia speciosa*, which was everywhere abundant. Another common tree was the false almond (*Terminalia Catappa*). The seeds of both these species float readily and the beach was in fact covered with their characteristic fruits. Other common trees, which possibly also originated from water-borne seeds, were *Cassia* sp. (possibly *fistula*), *Thespesia populnea* and, in one spot only, a small group of *Pandanus*. This was particularly interesting as our party was short of water at the time. There is no surface water on the island owing to the porosity of the soil, but on my recommendation potable water was found on digging at this spot, as *Pandanus* is a pretty good indication of the presence of fresh or only slightly-brackish water at no great depth under the surface.

In addition to these trees which had evidently arrived by water, were certain species that had probably originated from seed conveyed by birds. These included *Ficus*, *Eugenia* and *Canarium*. The island so far as we could judge was uninhabited but it teemed with large purple fruit pigeons, responsible no doubt for the introduction of these species. There were also a few Megapodes (mound-building scrub turkeys) and how they had arrived on the island has always been a puzzle, as they prefer running to flying and do not appear to be strong on the wing or capable of sustained flight.

G. EVANS.

The Forests of Sweden.*—Sweden, with 56·5 per cent. of her area under forests, is one of the most heavily wooded countries in Europe, being surpassed in this respect only by Finland. Her position in the northern Coniferous zone with highly industrialised countries for neighbours, and her numerous rivers taking a south-easterly course, gradually thawing in the spring from mouth to source to provide a ready transport system for lumber, combine to make her forest industries the most important in the country. The resultant flourishing and active condition of Forestry in Sweden is clearly evident from a perusal of this booklet.

A brief account of the natural forest regions and a short history of forestry in the country make a background against which the

* By Th. Streyffert. New Sweden Tercentenary Publications. Alb. Bonniers Boktryckeri, Stockholm, 1938. Pp. 72. Price \$1.00.

development of the great lumber and wood-pulp industries can be seen in true perspective. The location of the larger sawmills and pulp-mills at the river mouths is shown very clearly by maps marked by circles proportional in size to the numbers of workers employed. The heavy demands of the lumber and pulp industries on the forests are balanced, as in few other countries, by the annual increment of growth. This happy state of affairs is due largely to compulsory provision for reproduction after felling which has been enforced by law since 1903. An active Forest Experiment Station, working in close union with the College of Forestry at Stockholm, is of great value in carrying the application of modern scientific research into the forests. The ownership of the forests, the scope and organisation of silvicultural work in the country and the importance of forestry as a source of employment are other topics dealt with in this interesting survey of Forestry in Sweden. The book is illustrated by maps and photographs.

Wild Flowers of Attica.*—This volume is intended as a memorial to the late Shirley Clifford Atchley, to whose great knowledge of Greece and the plants of Greece so many botanists and horticulturists are deeply indebted. When Atchley died in 1936 he left manuscript notes prepared by himself and a series of paintings of Greek plants made, under his direction, by Mr. W. O. Everett of Athens. Atchley's daughter, Mrs. Dixon, held the full copyright of the paintings and arranged with the Clarendon Press for the publication of the manuscript notes and a selection of the paintings. Dr. Turrill, acting as honorary editor, prepared the manuscript, selected the paintings, and saw the work through the press, besides providing letterpress for those paintings not referred to in the original manuscript notes. All concerned with the publication may be congratulated on the appearance of an interesting and useful work. A foreword by Sir Sydney Waterlow, British Minister at Athens, shows clearly how Atchley's life and work for both Great Britain and Greece were appreciated by his colleagues and the affection they felt for him. Sir Arthur Hill gives an interesting outline of Atchley's life and indicates briefly his great services to botany and to Kew in particular.

The body of the book consists of short descriptions and field notes of many of the more conspicuous or more interesting species of the flora of Attica. Since these notes represent the observations of a keen observer and field botanist they have considerable botanical value. Some of them are very typical of their writer's whimsicality and sly but never unkind humour. Not all of the species referred to in the text are represented on the plates, since it was thought advisable to publish all of the manuscript notes. Seventy-nine species are represented by coloured figures, some two, but mostly

* By the late Shirley Clifford Atchley, C.M.G., O.B.E., prepared for publication by W. B. Turrill, D.Sc., F.L.S. Oxford, at the Clarendon Press, 1938. Pp. xix + 60, xxi plates and frontispiece in colour. Price 25s.

four to a plate, though on the frontispiece *Mandragora autumnalis* occupies the whole plate. These figures are not all of equal merit and some suffer from the reduction to which they had to be subjected. On the whole, however, they are very satisfactory and their reproduction is excellent. The text is clear and, as one would expect from the Clarendon Press, exceptionally well produced. Those who understand good fount have pronounced that used throughout the volume to be very beautiful.

The text and the figures together form a useful introduction to the Attic flora. Had the author lived to produce a similar second volume, as his preface says it was intended to do if a first volume met with favour, most of the flowering plants likely to be seen by visitors to Attica would have been represented. Even with this one volume the traveller will have a valuable guide to the flora, and it may be hoped that many who visit Greece will be stimulated by this work to study the plants of a country whose history is that of the beginnings of modern civilization and whose natural beauty is not even yet destroyed by man and his domestic animals.

An Introductory Text-book of Botany.*—If the demand for a continuous flow of new text-books be a sign of vitality in a science, one must conclude that botany in Britain is in a vigorous condition. Every teacher complains that the ideal text-book has yet to be written, unless, of course, he has published one himself, but at present he has many to classify into groups better or worse than the mode. The book noticed here is, however, largely written from fresh view-points and, mainly as an introduction to laboratory work, should fulfil a useful purpose. While it covers the first year's course in botany in the University of Leeds it would also suffice for the corresponding course in the University of London, and no doubt in other universities, so far as the gross morphology, anatomy, and physiology of Angiosperms are concerned. It is, however, inadequate in the treatment of ecology and taxonomy. This is unfortunate, since both subjects are basic to a proper understanding of the science and, moreover, the student who is not made familiar with their principles and given opportunity to apply them early in his studies is at a decided disadvantage at all later stages of his career.

For the actual contents of the book there can be little but praise. It is full of suggestions for the use of a wide range of material which is often neglected by teachers and students. The drawings, diagrams, and photographs are new, clear, and adequate, and properly illustrate the text, which is decidedly "readable." A full index is provided.

W. B. TURRILL.

* "An Introduction to Botany, with Special Reference to the Structure of the Flowering Plant," by J. H. Priestley and L. I. Scott, Longmans, 1938. Pp. x + 615. Illustrated. Price 17s. 6d.

Humus.*—Nowadays the view is widely held that the use of mineral fertilizers alone does not necessarily ensure that the grower will obtain the best possible crops from his land. Consequently there has been an intensive study of the importance in plant nutrition of those partially decomposed plant remains which are collectively known as humus. Very varying claims concerning the significance of humus in plant nutrition have been made by various authors, and it is therefore useful to have the different views on the subject and recent researches summarized in a single volume.

The second edition of Professor Waksman's work on humus will be greatly appreciated by soil experts and more general readers alike. When reading this book one cannot fail to be impressed by the uncertainty and controversial position of the study of many aspects of this important subject. In the author's view, humus is of admitted value in plant nutrition, but chiefly because of its effects on the physical and chemical properties of the soil, and because it provides a suitable medium for microbial activities. It is improbable that the constituent complexes can be directly assimilated by the plant. References are given to no less than 1608 articles on the subject, and the book ends with author and subject indexes. It is rather curious to find on page 17 members of the fern genus *Adiantum* referred to as "forest shrubs," but this is only a small blemish in a book which will be found useful by all who are interested in the scientific study of the soil.

C. R. METCALFE.

Plant Physiology.†—A few years ago, English-speaking students could justly complain of the lack of a modern textbook on plant physiology. Since then, however, several reliable textbooks on this subject have been published, one of the most recent of which is by Professor Seifriz of the University of Pennsylvania. The author states in the preface that he has tried to avoid making dogmatic statements, and that he has illustrated his points wherever possible by reference to well known facts which can be observed every day. Another important aim has been to make the student think for himself. The subject matter is wide in scope, and includes something about all the important branches of plant physiology, and a limited number of references are given to books and other literature suitable for further study. The author has, in some instances, sought the aid of specialists who have helped to compile those sections of the book which deal with their respective fields. For instance, Dr. P. W. Zimmerman has assisted with the chapter on hormones and growth-promoting substances. On the whole the book is written in a clear and lucid style, and the illustrations

* "Humus: Origin, Chemical Composition, and Importance in Nature." By Selman A. Waksman. London, Baillière, Tindall and Cox, 2nd edition, 1938. Pp. xiv + 526. Price £1 10s.

† "The Physiology of Plants," by William Seifriz. New York, John Wiley and Sons Inc.; London, Chapman and Hall Ltd. 1938. Pp. vi + 315, 95 figs. Price 17s. 6d. net.

are simple and carefully selected. Chapter 21 includes a brief account of the modern methods of growing plants in chemical solutions. This, together with the picture on p. 247 of some *Gladioli* flourishing in a culture solution, should arouse the interest of students far more than the rows of rather anaemic looking plants in glass jars which are a familiar feature of the older textbooks. This type of improvement is characteristic of the whole book, which should prove to be a useful introduction to plant physiology.

C. R. METCALFE.

British Guiana Papers.*—This considerable volume represents the first instalment of results of the Oxford Expedition to British Guiana in 1929. The preface and list of members are followed by a reprint of an account of the Expedition which was read to the Royal Geographical Society by its leader, Major R. W. G. Hingston. The rest of the volume is devoted to reprints of numerous papers. These include almost the whole of the botanical results, both ecological and taxonomic, and the impression gained is that really valuable work was accomplished from both standpoints by means of a successful collaboration. Rarely before can a small piece of tropical forest have been studied so scientifically and in such detail, and even more rarely has the identification of so many of the trees mentioned been fixed. There are also valuable papers on the ornithology and entomology of the area, including a complete revision by Dr. O. W. Richards (a member of the Expedition) of the American species of *Trypoxylon*, a large genus of wasps. Owing to the immense size of the entomological collections and the great difficulties attending taxonomy in this branch of science—systematic botanists do not sufficiently realise how happily they are placed in comparison with their entomological fellow workers—it is evident that very many years must pass before the entomological results are even nearly concluded. Nowadays, many much advertised and lavishly equipped expeditions seem to end in a radio talk, a lantern lecture, a travel book and, perhaps, the partial incorporation into museums of the collections obtained; the Oxford Exploration Club is therefore to be congratulated on this scientific justification of its first tropical venture, which cost only £1,171 for about eleven men. If one examines the reasons for this success they are clearly to be traced to the choice of a single small area for study, to the blending of untrained undergraduates with enthusiastic specialists under a tried and capable leader, and to the constant help and guidance of a most able Department of Forestry. We look forward with interest to the completion of the work and hope that any further tropical expeditions of the Oxford Exploration Club may furnish equally valuable results.

* "British Guiana Papers," Scientific Results of the Oxford University Expedition to British Guiana in 1929. Published for the Oxford University Exploration Club by the Oxford University Press, London, 1938.

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